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Original Articles

SPINAL DECOMPRESSION IN MENINGOMYELITIS[1]

By Alfred S. Taylor, M.D.

CONSULTING SURGEON TO HOSPITAL FOR RUPTURED AND CRIPPLED N. Y.,
PROFESSOR OF OPERATIVE SURGERY, CORNELL UNIVERSITY

And J. W. Stephenson, M.D.

CHIEF OF CLINIC AT THE NEUROLOGICAL INSTITUTE, CLINICAL ASSISTANT IN
NEUROLOGY AT VANDERBILT CLINIC OF NEW YORK CITY

This paper is presented not so much to urge radical surgical intervention in all cases of meningomyelitis, as it is to record such facts and observations as we have been able to collect in a very small series of four cases in which operation was done, and in three of which the results were strikingly satisfactory, in a disease which has heretofore been considered the strongest contraindication to surgical attack.   These results raise the question whether in selected cases, decompression will not only greatly shorten the period of invalidism but also very considerably enhance the completeness of recovery.

That this disease is considered to contraindicate surgical intervention is strikingly illustrated by the fact that, in a careful search of the literature since 1907, Dr. Stephenson was able to find record of only one case in which operation had been done.   This was done in 1909 by Krause and the clinical history, the operative

[1] Read at the fortieth annual meeting of the American Neurological Association, May 7, 8 and 9, 1914.

findings, and the principles of operative treatment were nearly identical with those in our small series, although we did not know of his case until nearly a year after our last case had been operated upon.[1]

Except in syphilitic cases the usual outlook in non-fatal cases of meningomyelitis is for a tedious illness followed by slow cessation of active symptoms and the persistence of a greater or less degree of invalidism according to the site and amount of permanent damage to the cord substance.

It will conduce to brevity to record the case histories and then to make such remarks and draw such inferences as may seem to be warranted.

At the outset we wish to make acknowledgment to Dr. A. R. Diefendorf, of New Haven, for giving one of us (Taylor) the privilege of operating upon the first two cases, and for kindly permitting us to incorporate the two cases with his notes in this paper.

CASE I.—Thos. K. 40 years. Teamster. (Referred by Dr. Diefendorf.)

Previous History.—No evidence of turberculous or specific infection. He is married and has had eight children of whom five are still living and healthy. At 18 years he had gonorrhea.

Present Illness.—In February, 1910, he suffered from paroxysmal stinging pains, just above the right Poupart's ligament, which appeared on rising mornings and lasted for about ten minutes. There was also pain at the outer side of the left knee when he started to walk.

In November, 1910, instead of the above pains which had disappeared for a short time, he developed below the ribs on both sides severe lancinating pains which shot both forward and upward. These were attributed to pleurisy and disappeared under treatment.

In February, 1911, after exposure to bad weather, he went to bed with a recurrence of the pains accompanied by a cough with expectoration. From February 7, the pain became "band like." On February 14, 1911, while in bed he noticed that his legs were weak. On February 18, the legs ceased moving, and abdomen became like a drum. On February 20, catheterization became necessary. On February 23, incontinence of feces developed. February 24, 1911. Physical examination (Dr. Diefendorf).

Hypesthesia to pain, temperature and touch from the toes to the level of the twelfth dorsal segment. There are no distinct areas

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[1] Krause, " Surgery of the Brain and Spinal Cord."

of analgesia. In some areas, especially on the right side the temperature and pain changes coincide in level, while the tactile changes are always one to two inches lower than the pain which is uniformly the highest.

Paralysis is complete from the knees down. The thigh muscles have slight power, the adductors being the strongest. The abdominal muscles are powerless.

Absent on both sides Achilles reflexes, Babinski's sign, testicular and umbilical reflexes.

Present on both sides normal knee jerks.

Firm pressure over the tenth dorsal spinous process causes stinging pain elicited over no other spine.

March 1, 1911. The patient is tired, irritable, and suffers from loss of memory. There is now complete loss of the right knee jerk, partial loss of left knee jerk, and complete paralysis of the thigh muscles including the adductors. The upper level of sensory disturbance is now at the tenth instead of the twelfth dorsal segment. The tenderness over the tenth dorsal spine is much increased.

For the last two days the evening temperature has reached 102° F., but has been normal all day.

There is a small bedsore over the coccyx.

March 3, 1911. Operation under ether by Dr. A. S. Taylor. Right unilateral laminectomy involving D ix, x, and xi was done. When the dura was opened there was no excessive tension of the spinal fluid present, nor was there any feeling of tumor. The whole dorsum of the cord was easily seen. The cord was intensely congested, and seemed somewhat swollen, but showed no irregularity in outline. The right anterior surface of the cord was easily brought into view by means of grasping the dentate ligament and so rotating the cord. The anterior surface showed the same conditions as previously described. The dura was sutured with a continuous catgut suture. The remainder of the wound was closed without drainage by layer sutures.

Following operation there was no change for the better in the neurological symptoms, the cystitis became aggravated, the general condition failed, and the patient died, March 27, 1911, 24 days after operation.

CASE 2.—Mike S. 48 years. Steel Roller. (Dr. Diefendorf.)

Previous History.—Married 20 years. Has four children living, 19, 18, 17, and 9 years old. No children dead and no miscarriages in the family. At 27 years of age had a small sore on the penis which healed promptly under local treatment. For years has taken beer and a couple of whiskeys every day.

Present Illness.—Three months ago (November, 1912), he developed pain over the lower ribs in the axillary line of the right side. He continued at work until about January 20, 1913, when he remained one day in bed because of great weakness in the legs.

Return to work was followed by the development of increasing pains in the mid lumbar region and below the knees as well as by increasing weakness. About January 27, 1913, he took to his bed for two days and developed "girdle sensation." There was no loss of bladder or bowel control.

Physical Examination, February 10, 1913.—Hypesthesia to pain and touch on right side to a level 1 inch below the umbilicus; less marked on the left side and to a level 2 inches below the umbilicus. No zone of hyperesthesia could be detected. Both knee jerks were increased, there was a Babinski on both sides, right ankle clonus was present. The cremasteric and umbilical reflexes were diminished. There was partial loss of power in both lower extremities, more marked in the right. There was marked tenderness over the twelfth dorsal spine.

February 19. There was obstipation and retention of urine. Paralysis of the lower extremities had become complete. Complete anesthesia for touch and pain to a level 3 inches above the umbilicus. The reflex of defense was present on both sides; the knee jerks were exaggerated; double Babinski was present as well as right ankle clonus. There was slight tenderness over the fifth to ninth dorsal spines.

February 19, 1913. Ether. Operation by Dr. A. S. Taylor. Right unilateral laminectomy was done involving D iv, v, and vi. The dura was divided longitudinally the length of the wound and showed nothing specially pathological. The cord was very greatly congested and apparently swollen, somewhat more on the right half of the cord. A longitudinal incision about 1 cm. long and 3 mm. deep was made in the posterior column a little to the right of the median fissure. This developed no evidence of an intra-medullary tumor or cyst. There was but very slight bleeding as the result of this incision, and it soon ceased entirely. The dura was loosely closed with the fine catgut sutures and the muscles by layer sutures without drainage. Healing was by primary union.

March 2, 1913. He has regained sphincteric control. Tactile and pain senses, save for a slight qualitative change, have returned in the lower extremities up to a level 1 inch below the umbilicus on the right and 2 inches below on the left side.

April 18, 1913. Very slight sensory reduction to the level of the sixth rib anteriorly. Motion: Right thigh shows slight power of extension, abduction and adduction. There is very slight power to extend the toes. The left lower extremity has regained all movements. Right knee jerk is slightly exaggerated, right Babinski is present but no ankle clonus. Left knee jerk greatly exaggerated, left Babinski is marked, but there is no ankle clonus. All the muscles respond to faradism. This patient moved shortly after this last examination and was lost to observation. He was said to have died in the summer of 1913, but nothing was known as to the cause of death.

CASE 3.—Jacob G. 62 years. Watchman.

His previous history was negative except for an attack of pleurisy and pneumonia in 1905. There was no history of lues or of a cough. His work subjected him to great exposure to cold.

Present Illness.—While at work in May, 1912, he was seized with intense pain in the back and chest. The back became very tender to touch. These pains persisted for several days, he was delirious and was said to have had fever. A few days after the onset an abscess developed over the second chondro-sternal junction on the right side. This was evacuated and the patient's pains were somewhat relieved. At the same time there developed retention of urine and swelling of the scrotum, but these conditions were of only temporary duration.
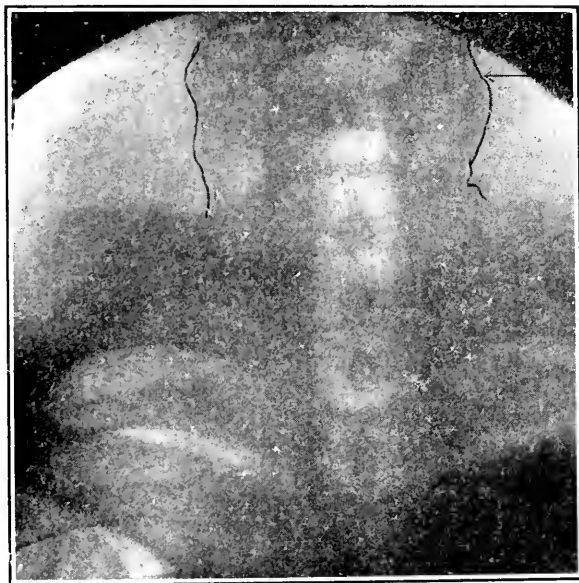
FIG. 1. Jacob G. Before operation. Note the infiltration on both sides of the lower cervical column obscuring the outlines of the transverse processes. Note the narrowing of the cervical canal from below upward. (These showed more distinctly in the plate than in the print.)

Pain and fever recurred at irregular intervals.

Early in August, 1912, the pain seemed to locate in the back of the head and the neck and this was soon followed by heaviness of the legs and difficulty in walking. The legs gradually became stiff and in place of the pains he began to have cramps which would double him up. Later he also noticed that the upper extremities were growing weak and stiff. About the middle of August he became bedridden. He had retention of urine with

dribbling overflow, and obstinate constipation.   On November 13, 1912, he entered the Neurological Institute, Second Division, after having been bedridden for three months, and suffering from severe paroxysmal cramps in the legs.

Physical Examination.—The patient was a short thick necked man, fairly well nourished.   There was complete spastic paraplegia.   There were no distinct atrophies though the leg muscles were flabby.   The knee jerks were plus and equal; the ankle jerks were plus and equal; there was double Babinski and Oppenheim. There was double ankle clonus, the right inexhaustible, the left exhaustible.   The epigastric and abdominal reflexes were very sluggish.

Fig. 2.   Jacob G.   About 16 months after operation.   The infiltration on the lateral aspects of the lower cervical spine has almost entirely disappeared.   The loss of bone due to the hemilaminectomy is seen just to the right of the spinous processes.   It shows most clearly in this print opposite the C vii and D i.

The muscles of the upper extremities were so weak that he could not feed himself.   The reflexes of the upper extremities were plus, the left being greater than the right.

There was diminution in thermal, pain, and tactile sensibility up to the level of the second dorsal segment.

There was no tenderness over the spines of the vertebræ but at the base of the neck alongside of the three lower cervical ver-

tebræ there was an infiltration of the soft tissues which was tender on pressure and limited the free mobility of the neck.

Over the second right chondro-sternal junction, at the site of the oldest abscess, there was an infiltrated area about 3 cm. in diameter which was very slightly tender.

The bladder was distended and the colon impacted.

Examination of the eyes was negative except for slight irregularity of the pupils.

Temperature on admission 103° F., P. 68, R. 18; blood pressure 140 mm.; R. B. C. 4,788,000; leucocytes 9600; neutrophils 62 per cent.; large lymphocytes 15 per cent.; small lymphocytes 22 pr cent.; transitionals 1 per cent.

The Wassermann test, the von Pirquet test, and the urinalysis gave negative results.

The spinal serology was negative except for a very marked increase in the globulin content.

The patient was kept under observation for 28 days in the hospital, during which time the temperature subsided to normal, but the other symptoms gradually progressed. Areas which showed only a sensory diminution previously, became anesthetic; the abdominal and epigastric reflexes disappeared, and the left exhaustible ankle clonus became inexhaustible. The cramp-like pains became more severe and frequent requiring the use of morphine.

Frequent catheterization became necessary and the bowels were evacuated only by enemata.

An X-ray picture showed a fusiform shadow involving the transverse processes of the C v, vi, and vii on both sides of the spine. This fusiform shadow corresponded in situation with the tender infiltration at the base of the neck previously mentioned. It also showed a symmetrical narrowing of the cervical canal from below upward to the level of C V.

December 10, 1912.—Ether. Operation by A. S. Taylor.

A right unilateral laminectomy was done from C V to D ii inclusive. The bone structure showed no macroscopical pathological condition, but the dura underneath was considerably thickened and congested. It filled the canal tightly. There was obvious narrowing of the bony canal as indicated in the X-ray picture. The inner surface of the bones was smooth and the condition was evidently of congenital origin. The dura was split the length of the wound. The cord, thus exposed, did not pulsate, was much congested and somewhat edematous, and so filled the dural canal as almost entirely to prevent the flow of spinal fluid.

The posterior column, just to the right of the median line, was incised longitudinally to a depth of 2 mm. for a distance of 3 cm. After a brief interval of observation the cord began to pulsate.

The dura was left unsutured. The remainder of the wound was closed by layer sutures. No drainage was used.

The wound healed by primary union.

Within four days after operation ankle clonus had again become exhaustible; and pin pricks were acutely felt over areas which were previously anesthetic. Within eight days he was able to move his legs voluntarily. Within sixteen days he walked the length of the ward with some assistance. The sphincteric control had become nearly perfect. He had an occasional cramp in his legs but never required an opiate.

Six months later he was walking daily to the park, a distance of half a mile, and in addition had three flights of tenement house stairs. This rapid recovery occurred after he had been confined to his bed for four months.

April 2, 1914, not quite sixteen months after operation, an examination gave the following results:

Station is good. Walks quickly and well. There is possibly the slightest suggestion of spasticity.

Reflexes: Abdominals and epigastrics are present but exhaustible. Cremasterics are not elicitable. The knee jerks are present, equal, and not exaggerated. The ankle jerks are present and equal. No clonus on either side. The plantar responses are flexor. No Oppenheim or Gordon reflexes present. In the upper extremity the responses are equal on the two sides, but are slightly exaggerated. Pupils react well to light and accommodation. There is slight atrophy of the thenar and hypothenar muscles on the right side.

Sensation is present everywhere to all forms of stimuli, but there is hyperesthesia below the level of the first dorsal segment.

The sphincters are under complete control.

The tender infiltration at the base of the neck which was present before operation has entirely disappeared, as has the induration at the site of the abscess beneath the clavicle. The neck moves with perfect freedom. Subjectively he complains of occasional pains about the shoulders, numbness of the fingers especially of the right hand, and numbness and coldness of the lower extremities, especially below the knee. (Compare with sensory tests.)

He is in condition to return to work.

Case 4.—Jacob O. 41 years. Laborer.

His previous history was negative. He has never had any venereal disease. He is married and has six children living and well.

Present Illness.— About March, 1910, he was struck on the right hip by a car fender. In a short time he returned to his work without any loss of function in the hip. From the time of this injury until August, 1912 ($2\frac{1}{2}$ years), he had pains in his right hip and thigh which he thought to be rheumatic. These pains appeared at irregular intervals and were often quite severe, but up to August never extended below the knee.

In August, 1912, while at work, he felt a sudden sharp pain in the back of the right thigh. This remained for three days and then suddenly disappeared. On returning to work a week later the pain recurred, and after three days disappeared, leaving the back of the thigh numb and insensitive to stimuli. Meanwhile a pain of similar character developed in the right heel. This pain was aggravated by placing the foot on the ground. Near the end of December, 1912, a nail stuck in his right heel and remained there for three days before his attention was called to it by the development of infection and swelling. He was taken to the hospital where the nail was removed and the infection cured. After the infection was gone there remained superficial ulceration and thickened fissured horny skin over the external aspect of the right heel and foot. The pains became rather more severe and he was unable to work during the three months preceding the operation in spite of medication and the use of the various methods of physical therapeutics.

There has been no disturbance of the bladder or rectum, except that micturition and defecation often were painful.

Physical Examination.—He is a well nourished, muscularly developed man. He uses crutches to keep the right foot off the ground.

The pupils are equal, and are normal in reaction to light and accommodation.

Tongue clear, moist and non tremulous. Throat normal.

Examination of the chest, abdomen and arteries shows nothing abnormal.

There is an area of anesthesia about three inches wide starting above at the right tuber ischii, passing downward to about three inches above the knee, where it passes to and down the outer side of the leg, ankle and foot, passing over somewhat onto the outer border of the plantar surface.

There is no paralysis of the muscles but attempts to bear weight upon the right foot cause obvious pain. The muscles on the right side seem softer (disuse) than on the left, but there seems to be no real atrophy.

The reflexes are slightly diminished on the right side.

On the outer side of the foot, extending from the back of the heel forward to the base of the fifth metatarsal, from the outer side of the plantar surface nearly up to the outer malleolus, is an area of skin which is thickened, horny, fissured, scaling and showing granulation areas at the bottom of the fissures. A little back of the center of this area is a small ulcer which has remained since the injury by the nail some three months ago.

March 25, 1913. Ether. Operation by A. S. Taylor.

A right sided unilateral laminectomy was done involving D x, xi, xii and L i and ii. The laminæ and the dura presented no patho-

logical appearance, nor did there seem to be any excessive pressure of spinal fluid on opening the dura.

The cord itself over the entire exposed area was considerably congested and the veins in particular were unusually distended.

There was no evidence of tumor or hemorrhage, nor was there any noticeable asymmetry of the cord.

The dura was sutured with a continuous fine catgut. The remainder of the wound was closed by layer sutures. No drainage was used.

Healing was by primary union.

Six days after operation the pains had disappeared from the right leg but there had been no objective change in the sensory disturbances.

Fourteen days after operation he sat up for two hours, was free from pain and felt generally well. The skin over the right heel had become much more nearly normal and the ulcerated surfaces had nearly healed.

Twenty days after operation, on April 14, 1913, which was just a month after he came into the hospital using crutches because he could not put his right foot to the ground, he left the hospital carrying his crutches under his arm and walking with only a slight limp. His general condition was excellent.

Dr. Cornwell, consulting neurologist of the hospital, examined him the day of his departure from hospital and left this note: "The patient shows practically complete restoration of sensory function from the external malleolus to the knee. There still remains a considerable loss of sensation to pain between the external malleolus and the plantar surface of the heel. There is also a considerable, though not complete, loss of pain sense along the course of the sciatic nerve from its pelvic exit to a point just above the popliteal space. The trophic disturbances in the foot have improved very materially, the only objective signs left being a moderate edema of the foot and a lower surface temperature as compared to the other foot. He still walks with a slight limp but without either crutches or cane which before had been indispensable."

March 24, 1914, one year after operation the sensory conditions remained exactly the same as when he left the hospital. Four weeks after leaving the hospital, which was seven weeks after operation, he took charge of the stock room and wagon loading department of a wholesale drug concern. He has never missed a day out of the whole year. He often shovels several tons of heavy fertilizing mixtures into carts in the course of the day's work, and frequently is called upon to lift 200 lbs. at a time. He walks long distances. The right leg gives him absolutely no trouble. The trophic disturbance on the outer side of the foot has never recurred, in spite of his hard work and the fact that he wears very coarse rough shoes.

His post operative state should be contrasted with the fact that for three months before operation he could not put his foot to the ground, and for four months preceding that, i. e., seven months in all, he had been unable to work because of the pain caused by muscular effort.

These cases have many features in common and are almost counterparts of the case reported by Krause. In three cases there was a history of exposure, twice to inclement weather and once to street car injury. In each instance the onset was in the form of severe neuralgic root pains referred to a fairly definite cord level. After these pains, which underwent remissions and exacerbations, had lasted for a variable length of time, there came a more severe attack of pain which was soon followed by motor disturbances, loss of sphincteric control and the other phenomena indicative of a transverse lesion of the cord. In the fourth case there were no motor nor sphincteric disabilities so that in this case the diagnosis will be questioned, but in every particular other than these it fits so well into the series that it seemed worth while to include it.

In each case the upper level of the lesion was pretty clearly indicated.

In two of the four there were trophic disturbances, one a bed-sore over the end of the spine, the other a disturbance over the outer side of the heel and foot.

In the two cases in which a temperature record has been preserved one ran up to 102° F., and the other to 103° F. during the attack.

The interval between the onset of definite symptoms and operative relief was Case 1, thirteen months; Case 2, three months; Case 3, seven months; while Case 4 had had seven months of disabling pain although his street car trauma which had occurred three years before had been followed by more or less continual discomfort.

In each case the cord was exposed by a unilateral laminectomy. In none of these cases was there any evidence of bone disease. The cord was very much congested and was obviously swollen but not sufficiently to fill out the dural canal. In Case 2 the swelling was more evident in the right half of the cord though there was no circumscribed tumefaction. An incision was made in the post-

erior column of the right side.   In Case 4, the symptoms were unilateral, the cord was equally congested on both sides.

In Case 3, in addition to the congenital narrowing of the bony canal which greatly aggravated the pressure effects, there was distinct inflammatory swelling of the dura as well as of the cord. The effect of these combined factors was to eliminate the flow of spinal fluid past this portion of the cord and to cause a cessation of circulatory pulsation in the cord.   Following decompression with wide opening of the dura and longitudinal incision of the posterior column of the cord there was very soon a relief of tension as indicated by the return of pulsation in the cord.

With the clinical histories and operative findings the diagnosis of meningomyelitis is established apparently in all the series with the possible exception of the fourth which was somewhat atypical.

In none of the series was there any postoperative shock, or any exacerbation of the symptoms even of a temporary nature.

In Case 1 operation had no effect whatever and there was a steady progression of the symptoms until death occurred on the 24th day after operation.   Unfortunately no autopsy was permitted.

In the remainder of the series the improvement was prompt and remarkable when it is considered that there had been progressive disability over a period of months preceding the operation.   Within four to eleven days the pains and objective sensory disturbances had largely disappeared, the sphincteric control had returned shortly after that, and motor power had reappeared in eight days in Case 3, although he had been bedridden and unable to move his legs for months.   In sixteen days he was walking the length of the ward.

The last two of the series are still under observation.   They have suffered no setbacks since operation, have no pains and no motor disturbances, and may fairly be considered cured.

The second case remained under observation only about five weeks, but during that time sphincteric control had returned, the sensory symptoms had nearly disappeared, and the return of voluntary power in the muscles of the lower extremities was well advanced, so that he also should be classed as a successful result. Rumor says that he died several months later but nothing can be learned definitely as to the fact or of the cause of death.

Statements as to the way in which decompression acts must

of course be speculative. To us the most rational explanation lies in an improvement in the local circulation with the resulting more rapid absorption of the inflammatory infiltration and the return of function in the damaged areas of cord. This is especially corroborated by the findings and results in the third case. Here the combination of congenital narrowing of the bony canal, with marked inflammatory thickening of the dura and swelling of the cord substance had caused pulsation to cease. Decompression, free splitting of the dura, and incision of the posterior column of the cord caused, within very few minutes, the return of full pulsation in the cord substance. Cord function returned in a surprisingly short interval.

Just what value lies in the incision of the posterior columns of the cord remains to be proven by further investigation, but it would seem to improve the drainage of the inflammatory exudate away from the cord into the spinal fluid and so hasten the return of the cord to normal.

The experimental work on the traumatized cords of dogs, reported before this association by Allen of Philadelphia, in which free incision of the posterior columns greatly lessened the amount of permanent damage from a given degree of injury to the cord, strongly argues for the addition of this detail of technic to the bony decompression and free division of the dura.

Properly executed incision into the posterior columns of the cord, in the living human subject, has repeatedly been shown to be innocuous by Elsberg, and others as well as myself.

Conclusions

1. Selected cases of meningomyelitis are susceptible to surgical treatment, where the findings indicate the segmental level.

2. This treatment should consist in laminectomy, free opening of the dura, and, probably, incision into the posterior columns of the cord, especially in those cases showing marked infiltration and swelling of the cord.

3. This operation, properly performed, adds very little to the jeopardy of the patient, but, on the contrary, seems to greatly diminish the period of convalescence and to lead to a more nearly normal return of function in the cord than is usual in these cases when treated expectantly. Many surgeons have demonstrated that laminectomy is not a very dangerous operation.

4. Decompression probably acts favorably by causing freeer circulation, with the more rapid absorption of the inflammatory exudate.   Incision of the cord probably facilitates drainage.

5. The small risk inherent in laminectomy, and the great advantage likely to accrue to the patient, argue much in favor of the surgical treatment of these cases.   The same facts also argue for the earlier employment of exploratory laminectomy in most spinal cases where the diagnosis is not perfectly clear, but where the symptoms point to some cord level as the seat of trouble.

THE PATHOLOGY OF TABETIC OCULAR PALSY WITH REMARKS ON THE RELATION OF SYPHILIS TO THE SO–CALLED PARASYPHILITIC DISEASES[1]

By WILLIAM G. SPILLER, M.D.

PROFESSOR OF NEUROPATHOLOGY IN THE UNIVERSITY OF PENNSYLVANIA

The long struggle, led especially by Fournier and Erb, to establish a relationship between syphilis and the diseases known under the term of parasyphilis has been crowned with success, but since the finding of the *Spirochæta pallida* in paresis and tabes by Noguchi and Moore, and the confirmation of these findings by other investigators, the parasyphilitic diseases have become the subject of an important discussion. Our present knowledge of syphilis of the nervous system has been presented clearly in the recent papers by Nonne at the meetings of the International Medical Congress and the Deutsche Naturforscher und Aerzte. We recognize tabes, paresis, tabo-paresis, primary optic atrophy and cerebro-spinal syphilis as caused by the *Spirochæta pallida,* and these disorders are distinct clinical forms, but many clinical and pathological cases make us consider whether the sharp distinctions are invariably to be maintained, whether tabes and paresis are truly parasyphilitic diseases or are more closely syphilitic affections. I have frequently had difficulty in deciding whether a certain clinical case should be regarded as one of tabes or spinal syphilis, and while paresis and cerebral syphilis are comparatively sharp clinical forms, there are cases where one may hesitate to decide whether the diagnosis should be paresis or cerebral syphilis, and cases even have been described in which cerebral syphilis was supposed to be associated in the same person with paresis. There is reason to believe that special strains of the *Spirochæta pallida* may exist, as shown by Henry J. Nichols,[2] and may cause different syphilitic diseases of the nervous system.

The paper by Nonne[3] on the present status of the syphilis tabes

[1] Read at the fortieth annual meeting of the American Neurological Association, May 7, 8 and 9, 1914.

[2] Nichols, Journal of Experimental Medicine, April 1, 1914, p. 362.

[3] Nonne, Deutsche Zeitschrift für Nervenheilkunde, Vol. 49, p. 384.

paresis question is so important, and apparently so unknown to some, that it seems well to give a brief abstract of it.

Erb gradually became convinced of the true syphilitic nature of the so-called parasyphilitic diseases, and doubted because of many clinical facts whether one could speak of metasyphilitic, parasyphilitic, or post-syphilitic diseases. Hirschl regarded paresis as nothing more than a late effect of syphilis, as a syphilitic encephalitis with termination in syphilitic cerebral atrophy. Raymond took the same stand in the discussion held in Paris over paresis, and Leredde before 1908 declared that tabes and paresis are anatomical and clinical forms of nervous syphilis, the results of a slowly developing syphilitic process. Many transitional forms occur between paresis and tabes on one side and the "true" syphilitic diseases on the other. The examinations of the cerebrospinal fluid have given the same results for tabes and paresis as for nervous syphilis, except that there are quantitative but not qualitative differences. Jakob and Kafka have shown that paresis may be very typical in its clinical serologic appearances, and that what appears to be typical paresis is shown not to be paresis by the microscope. This has been demonstrated also by Schoenhals, and Nissl emphasizes this fact. Everyone knows, says Nonne, of cases in which the clinical picture at first was that of arterial or meningeal cerebral syphilis but later was typically that of paresis. He has seen such cases almost every year. As for a difference regarding the time interval there are many cases in the literature in which paresis and tabes have appeared within two or three years after the infection. Nonne has seen tabes begin one and a half years after the infection.

As for the effect of treatment, everyone knows that antisyphilitic treatment fails in the arteritic or endarteritic form of syphilis of the brain and cord. Erb and Nonne declare that antisyphilitic treatment is of service in tabes, and others assert the same for paresis.

Nonne says it is certain that the characteristics of paresis as described by Nissl and Alzheimer exist, but Nissl himself acknowledges that all the lesions of paresis found in the cells, vessels, and neuroglia, and the appearance of plasma cells occur with other processes, and the only essential histological features of paresis are the extent and intensity of the vascular changes, the great extent of the alteration of cells, the intense loss of fibers, the situa-

tion of the neurogliar proliferation, the disturbance of the cell arrangement, the preference of plasma cells and lymphocytes for the sheaths of the vessels, and the greater implication of the frontal lobes. Obersteiner, however, has shown that paresis affects the whole brain, the white matter as well as the gray, the cerebellum and spinal cord, and Nonne says all the findings of paresis in their individuality present no differences from those of other syphilitic diseases. Binswanger long ago described the combination of paresis and true syphilis of the brain, and this combination has been shown by Alzheimer, Sträussler and A. Jakobs, and such cases are becoming common.

Tabes formerly was believed to be a primary degeneration of the nervous system. Dejerine and later Dinkler described meningitis occurring with tabes, but this was supposed to be merely a combination of lesions. Schröder in 1906 and E. Meyer and Gustav Oppenheim in 1908 showed that collections of lymphocytes and plasma cells in the perivascular lymph sheaths occur in tabes as in paresis in the pia and the vessels in the pial septa, and even within the posterior and lateral columns of the cord, therefore says Nonne we must reconsider whether tabes is primarily a disease of the parenchyma of the spinal cord.

The most characteristic lesion of cerebro-spinal syphilis, in my experience, is round cell infiltration, lymphocytic infiltration, of the pia. It is often associated with perivascular round cell infiltration within the brain and cord substance. It is not pathognomonic and may occur with some other conditions, but I believe there is no acute manifestation of syphilis of the cerebrospinal axis without it. Changes in the walls of the blood vessels, thickening of the intima, often are present, but the lymphocytic infiltration may be the only lesion. I have a brain in my possession that shows a moderate but distinct lymphocytic infiltration of the pia and no pronounced change in the vessels. It was from a patient who had been under the care of Dr. James Tyson and Dr. William F. Norris and had had clinical signs of syphilis thirty-one years, and had received much anti-syphilitic treatment. I have other specimens justifying the statement that the lymphocytic infiltration may be the only lesion of syphilis.

It is questionable whether these lymphocytic cells act mechanically by pressure; where they are in large masses they probably exert pressure on nerve fibers passing through the masses. The

lymphocytic infiltration has appeared to me as an index of the intensity of the pathological condition, as a reaction to a toxic condition of the cerebro-spinal fluid, and it is this toxicity which produces degeneration of nerve fibers and the lymphocytic infiltration; therefore the lymphocytic infiltration always has a pathological value.

We see clinical cases of so-called monosymptomatic tabes, or cases in which two or three signs of tabes are present. Some times microscopical examination shows a pronounced, but not necessarily intense, lymphocytic infiltration of the pia and slight degeneration of the posterior columns as in tabes. Is this incipient tabes? Why not equally well incipient syphilis? The lesions of syphilis may not develop beyond a lymphocytic infiltration of the pia in thirty-one years, as shown by the case referred to above, and if some degeneration of the posterior roots occurs in such a case the process is not essentially different.

Difference of opinion exists as to the nuclear or nerve origin of tabetic ocular palsies and a distinction is made by some in the pathology of the ocular palsies of tabes and brain syphilis. It would seem from the study of the following case of complete bilateral tabetic ophthalmoplegia that this distinction is unreliable and that in this as well as in other respects the sharp limitation formerly made of parasyphilis and cerebro-spinal syphilis needs much modification.

J. F. laboratory no. 631 was admitted to my service at the Philadelphia General Hospital Jan. 29, 1913, and died Feb. 19, 1913. He had a chancre in 1895. The right knee became much swollen in the winter of 1908 and the swelling was without spontaneous pain or pain on motion. About 1911 the right eye closed and within a few months the left eye closed so that to see he was obliged to raise either upper lid with his fingers. He had sharp shooting pains in the lower limbs before the arthropathy of the right knee developed, and his lower limbs felt as though they were pricked with pins. He complained of girdle sensation and said he felt as though a strap were tightened about the lower ribs and waist. In walking on the street he would stub his toes thinking he had raised his toes high enough to clear the ground. He evidently had at this time impairment of the sense of position. His urine dribbled occasionally and at times urination was accomplished by much straining.

When he came into the hospital the right knee was greatly swollen and crepitation was obtained upon pressure. The right leg could be rotated outwardly and inwardly to an abnormal de-

gree. The left lower limb also presented much hypotonia. The lower limbs were much atrophied. The tendon reflexes of the upper limbs were diminished. The patellar and Achilles tendon reflexes were lost. The finger to nose test showed ataxia. Dr. Hansell examined the eyes Feb. 2, 1913, and reported that there was total internal and external ophthalmoplegia of both eyes, with paralytic divergence. The iridic reaction was lost. The optic nerves were partially degenerated.

At the necropsy performed by Dr. G. McConnell, the enlarged right knee joint was somewhat fluctuating and hard irregular masses could be felt within it. The upper portion of the tibia was enlarged and roughened and the knee joint was so damaged that the leg could be moved in all directions. When this joint was opened about 500 cc. of thick brownish fluid escaped, leaving a sac lined with a thick membrane from which hung numerous irregular calcified masses. The lower end of the femur was thickened and very irregular, but appeared to be covered by the periosteum.

The region of the ocular nerves in the brainstem was cut in microscopical serial sections and one of every ten sections was stained by the Weigert hematoxylin method. A similar series was made with nuclear stains, and Nissl sections also were made.

Much lymphocytic infiltration was found in the pia of the spinal cord and base of the brain and the basilar artery presented much endarteritis. The posterior lumbar roots and the posterior columns of the cord were degenerated in the usual manner of tabes.

The ocular nerves were cut separately from the brain. Each oculomotor nerve showed much lymphocytic infiltration and this infiltration was more intense in the left nerve. These nerves were much and equally degenerated, and the degeneration was greater than that of the abducent and trochlear nerves. The oculomotor nuclei were greatly atrophied and contained few nerve cells, and the oculomotor fibers within the cerebral peduncles were much fewer than normal. Patches of rarefied tissue containing few nerve fibers were found within the oculomotor nuclei. The Edinger-Westphal nuclei were much better preserved than the other portions of the oculomotor nuclei.

The trochlear nerves showed slight lymphocytic infiltration.

The left abducent nucleus was considerably more atrophied than the right although the right nucleus was much affected. The abducent nerves were much atrophied, the left more so than the right. Both these nerves presented considerable lymphocytic infiltration, and the left more than the right.

The degeneration of the oculomotor nerves was so far advanced that it was impossible to decide whether the degeneration began in the nerve or in the nucleus, but the findings in the abducent nerves were of importance in this respect. The left nucleus and nerve

were considerably more degenerated than the right, and the lymphocytic infiltration of the left nerve at its exit from the upper medulla oblongata was greater than that of the right. This would seem to indicate that the syphilitic process was primarily in the nerve rather than the nucleus, and would make a distinction between the ocular palsies of tabes and syphilis unreliable. This case clinically was distinctly one of tabes, and the pathological findings in the cord were those of tabes.

Among writers who have given attention to the pathology of ocular palsies in tabes and syphilis the view has been largely held that tabetic palsies are usually of nuclear origin while those of brain syphilis are usually from nerve degeneration. Thus Uhthoff gives a long list of authors as references for his statement that tabetic ocular palsies are often nuclear in origin, but he states that many of these authors speak of degeneration of root fibers of these ocular nerves and of the nerves themselves in addition to the nuclear lesions as almost constant findings. Cases of tabetic ocular palsy in which only the nuclei of these nerves are degenerated are very rare, chiefly because the examination is made long after the onset of the palsy when the nerve lesions must follow the nuclear. In some cases the cells are reported as more degenerated than the nerve fibers of the ocular nerves, and on this account the nuclear degeneration is supposed to be primary. In other cases the nerve lesions are more intense than the nuclear. Nevertheless Uhthoff asserts that a considerable number of cases show the degeneration to be primarily nuclear either by absence of peripheral change or greater degeneration of the nuclei, and he believes these cases are the more numerous. Ependymal proliferation of the aqueduct of Sylvius and the fourth ventricle appears to be relatively seldom the cause of tabetic ocular palsy. Hemorrhages in the ocular nuclei are seldom observed and in part at least occur shortly before death.

Uhthoff[4] states that pronounced external or total ophthalmoplegia has occurred only in about two per cent. of his tabes cases, but he found about 40 cases with necropsy in the literature.

Uhthoff in contrast to his views regarding the greater frequency of nuclear lesions as the cause of tabetic ocular palsy, states that he believes single or double oculomotor palsy in syphilis, even when other symptoms fail, very rarely is of nuclear origin and almost always is basal.

[4] Uhthoff, Graefe-Saemisch Handbuch der gesamten Augenheilkunde, Vol. XI, part 2A.

He refers to a case reported by v. Monakow of total ophthalmoplegia in which the oculomotor nuclei were degenerated and the abducens and trochlearis nuclei were almost normal. He believed that the ophthalmoplegia in part was caused by the implication of fibers from the cerebral cortex to the nuclei.

Nonne[5] makes a distinction between the ocular palsies of tabes and syphilis. The disappearance of ocular palsy is not characteristic of syphilis, he says, as this very often occurs in post-syphilitic tabes.

He refers to some cases in which the lesions were at the sphenoidal fissure, in these cases the symptoms were amaurosis, paralysis of all external and internal ocular muscles, anesthesia of the first branch of the trigeminus, pain in the depth of the orbit, edema of the upper lid and slight exophthalmos.

He states that although one might expect to find isolated nuclear disease in syphilitic ocular palsy, as individual branches of the oculomotorius are often paralyzed, no necropsy has shown this. Wilbrand and Saenger, he says, make the same statement.

Wilbrand and Saenger[6] state that in the majority of cases of tabetic opthalmoplegia intense atrophy of the nuclei of the ocular nerves was found as well as of the nerve roots, nerves and muscles. They speak of the lesion as primarily nuclear (p. 153).

In speaking of Hutchinson's case of ophthalmoplegia examined microscropically by Gowers, these authors say syphilis as the cause of primary nuclear degeneration in this case is doubtful and the case must be regarded as one of tabes. Oppenheim's case, they state, is the only one they know of in which primary nuclear atrophy occurred during the period of constitutional syphilis (p. 333).

They thus sharply define tabetic ophthalmoplegia as primarily nuclear in the majority of cases, and syphilitic ophthalmoplegia as primarily basal.

The question arises as to the influence of the ocular centers upon one another. That some sort of connection must exist is shown by the paralysis of lateral associated movement with preservation of the function of the internal rectus in convergence. Leonard J. Kidd[7] has recently discussed the method of connection of these ocular muscles. He shows that the widely accepted teach-

[5] Nonne, Syphilis und Nervensystem. Second edition.
[6] Wildbrand und Saenger, Die Neurologie des Auges, Vol. I.
[7] Kidd, Review of Neurology and Psychiatry, Oct., 1913, p. 507.

ing that lateral conjugate eye-movements are carried out by virtue of fibers, which the sixth nucleus is alleged to send to the contralateral third nucleus or root for the innervation of the internal rectus muscle, has been demonstrated to be erroneous by the sure test of carefully planned and executed experimentation. He calls this sixth nucleus hypothesis the Duval-Laborde hypothesis.

Van der Schueren has established that in the rabbit the posterior longitudinal bundle in its course between the level of the sixth nucleus and the fourth and third nerves contains ascending fibers which are connected with the cells of the homolateral fourth and third nuclei. The sixth nucleus sends no fibers into the posterior longitudinal bundle, and no neurones connect the sixth nucleus with the fourth and third nuclei. Yet in all cases of loss of lateral conjugate eye movements, accompanied by preservation of the action of the contralateral internal rectus muscle in convergence, which have been carefully examined pathologically, Kidd says evidence is found of the presence of degenerated fibers in the posterior longitudinal bundle. Van Gehuchten expressed the opinion in 1892 that the posterior longitudinal bundle seems to be sufficient to carry out the lateral conjugate eye movements by means of the fibers which pass in that bundle to the various ocular nuclei. Many other authors have held the same opinion, and Kidd thinks we can have no reasonable doubt that this opinion is correct, and that the infracortical mechanism for the lateral conjugate eye movements depends on the ascending vestibulo-ocular fibers of the posterior longitudinal bundle.

If this be the correct explanation it is hard to understand how a lesion of nerve fibers of one ocular nerve could affect either of the other two ocular nerves. Why then do we get complete ophthalmoplegia in tabes or brain syphilis.

I have seen bilateral facial palsy in syphilis without any other symptoms and without any other nerve involvement, and the syphilitic meningitis must have picked out these two nerves alone. It is therefore possible that the ocular nerves should be paralyzed alone. Whether they are more susceptible to the syphilitic poison than are other cranial nerves is questionable. A more probable explanation, it seems to me, is to be found in the syphilitic meningitis which is most pronounced about the cerebral peduncles. Here the ocular nerves are near one another. The third nerve arises on the inner side of the peduncle, the fourth nerve passes on

the outer side of the peduncle, and the sixth nerve takes its course directly forward on the pons from its exit at the junction of the pons with the medulla oblongata, and comes close to the cerebral peduncle. We can readily understand why all the ocular nerves should be paralyzed in tabes or cerebral syphilis from meningitis about the cerebral peduncles, without implication of other cranial nerves, while such selective palsy would be difficult to explain on a nuclear hypothesis.

I have examined the sections from eleven cases diagnosed clinically as tabes. In all except two of these there was considerable lymphocytic infiltration of the pia and in some there was thickening of the pial vessels. In the two cases referred to above the lymphocytic infiltration was slight, and in one of these the degeneration of the posterior columns was slight; it was incipient tabes. I could add to this number, but eleven cases seem to be sufficient to permit an opinion.

The question of lymphocytic infiltration has been studied by Bresowsky.[8] He examined the spinal cords from 40 cases of tabes and in all, old as well as recent cases, meningitis was found, and was of severe type in about half of the cases. He believes the tabetic degeneration depends on the meningitis which affects nervous tissue in lessened vitality and this brings about the degeneration. It would seem from such findings as these that sharp distinctions pathologically can not always be made between tabes and spinal syphilis, and the differentiation from a clinical aspect may be equally difficult. It is becoming more and more impossible to separate sharply the parasyphilitic diseases of brain and spinal cord from cerebro-spinal syphilis. I believe if careful microspscopical examination be made of the region of the origin of the ocular nerves in the brain stem in cases of tabes with ophthalmoplegia, with the attempt to determine whether the lesion be primarily within the nerves or their nuclei, it will be found impossible to regard tabetic palsies of ocular muscles as primarily nuclear in origin. Most cases come to necropsy so late that the nerve fibers and nuclei are both intensely altered. In some instances, as in the case reported in this paper, the degeneration may be found to be greater where the lymphocytic infiltration is more pronounced. I[9] have discussed the ocular palsies occurring in cerebral syphilis in another paper.

[8] Bresowsky, Obersteiner's Arbeiten, Vol. XX, 1913.
[9] Spiller, Van Gehuchten' Festschrift. Le Névraxe, vol. XIV, 1913.

A CASE OF PROBABLE ENCEPHALITIS DUE TO THE INHALATION OF THE FUMES OF GASOLINE[1]

By Chas. S. Potts, M.D.

PROFESSOR OF NEUROLOGY IN THE MEDICO-CHIRURGICAL COLLEGE OF PHILADEL-
PHIA; NEUROLOGIST TO THE PHILADELPHIA GENERAL HOSPITAL

The production of more or less transient toxic symptoms such as headache, nausea, delirium and loss of consciousness by inhaling the fumes of gasoline is not uncommon. The production of more permanent symptoms referable to the nervous system is apparently not very common when the few cases of such that have been reported and the large quantities of gasoline now used are considered. Gasoline as sold contains a number of the different products of petrol distillation, such as naphtha, benzine and petroleum ether. The amount of these different hydrocarbons in commercial gasoline is not fixed, but differs in that of different manufacturers. D. Felix[2] in 1872 studied the effects of the inhalation of both benzine and petroleum ether and found that each caused vertigo, nausea, sleepiness, injection of the conjunctiva, burning pains in the chest and irritating cough. If the inhalation was continued loss of consciousness resulted. Oliver[3] speaks of the inhalation of petrol causing headache, vertigo, vomiting and unconsciousness. He further says[4] that inhalation of either benzine or naphtha will cause mental depression, hallucinations, loss of memory, blindness and multiple neuritis. Rambousek[5] says that some naphtha products irritate the respiratory organs while others affect the *central nervous system*. The same author[6] states that poisoning may occur from cleaning out petroleum stills and mixing vessels and in empting out residues, and occasionally from the use of benzine in chemical cleaning. He also speaks of the possibility of poisoning in the refining of naphtha from the inhalation of the vapor of the light oils, benzine and gasoline. Fatal cases have been recorded in badly ventilated work rooms in which

[1] Patient shown to the Philadelphia Neurological Society. March 27, 1914. Read by title at the fortieth annual meeting of the American Neurological Association, May 7, 8 and 9, 1914.

the products of distillation are collected. He mentions the case of a workman who had entered an open benzine still to scrape the walls free of crusts containing benzine. He was found unconscious and died some hours later. He mentions another case of a man who started to clean a benzine still. When he entered the opening he became unconscious and cyanosed, the pulse was weak, the legs were spastic and the reflexes absent. These symptoms disappeared ninety minutes later. Another man who examined the outlet of a petroleum tank had symptoms in two minutes. Gowers[7] (quoted by Rambousek) reports a case of chronic poisoning following the frequent inhalation of gases given off from a petroleum motor. The symptoms were slurring speech, difficulty in swallowing, and weakness of the facial muscles. The symptoms disappeared when the man ceased his occupation but returned when he resumed it. Gowers believed the symptoms to be due to petroleum gas poisoning. In this connection it may be stated that among the waste products given off by a gasoline motor is carbon monoxide, such motors are therefore dangerous when running in a closed room. A case is reported[8] in which two men who were in a garage with closed windows while the motor was running were found unconscious. One in addition was cyanosed, the pulse weak and rapid, the other was pale and had clonic spasms. Both recovered. The possibility of the conditions described by Dana,[9] Spiller and McConnell[10] and others occurring should be remembered when such exposure has occurred.

The case I report was a white male aged 45 years, who was admitted to the Medico-Chirurgical Hospital in an unconscious condition on November 14, 1913. The history obtained at the time was that his occupation had been that of filling the tanks of automobiles with gasoline and while at work he had fallen over unconscious. He remained so for several hours and then passed into a stuporous condition which continued until November 25, when aroused from this he complained of intense headache. On admission his temperature was 97.4° Fahr., the pulse 80 and the respiration 20. A few hours later the temperature was 97° Fahr. and during the following three days dropped to that point several times, the pulse ranging from 72 to 90. When admitted he was regarded as suffering from gasoline poisoning. He was transferred to my service on November 24, and was first seen by me on that date. He was still quite stupid but could be aroused. It was then noticed that there was ptosis of the right eyelid and that the eyeball was drawn downward and to the right. Some

headache was complained of. The next day (November 25) the mental condition had much improved and he was examined by Dr. Weisenburg, an abstract of his findings being as follows:

Nearly complete oculomotor palsy on the right side, the only movements present being a slight contraction of the pupil to light and slight power of raising the eyelid. On the left side the pupil was smaller than that of the right and responded to light, all movements of the eyeball were lost excepting inward rotation and slight rotation outward. The eyeball was turned in when at rest. Associated movement of both eyes to the right was present. The angle of the mouth could not be drawn as well to the left as to the right (facial palsy of central type) and the arm and leg of this side were much weaker than those of the right. The knee jerks were increased, the left the more so, ankle clonus was present on the left side and plantar irritation caused a tendency to dorsal flexion of the toes on the left. There was marked dysmetria on the left side, the finger, in the finger to nose test, usually going beyond the nose, the movement being quick and jerky. Adiadochokinesis was marked in the left arm. Asynergia of the left hand was well shown. The same conditions were present in the left leg, the heel to knee test being poorly performed, asynergia being present and the muscle tone less as shown by the fact that the thigh could be flexed upon the abdomen much more than on the right side. The station was very poor, the tendency being to fall to the left. The gait was very unsteady, of the cerebellar type, the tendency being to go to the left. The left leg was dragged slightly. All other functions of the nervous system were normal. On November 29, he was carefully examined by the writer, and the following additional facts were elicited: His family and previous history contained nothing of note. He had always been a hard worker, drank three or four glasses of beer daily, did not use tobacco and denied venereal disease, the Wassermann test was negative. He had worked at his present occupation for four months. Two months before admission he was seized one evening with intense headache, nausea and vomiting which lasted all night. He went to work in the morning however but since has had more or less severe headache and dizziness. During this period he began to see double, one image being to one side and above the other. The symptoms present were the same as those found on November 25, except that the ptosis of the left eyelid was somewhat less and the movements of the left eyeball while still sluggish, were better, upward and outward movement being the most impaired. Attempts to move the eyeballs caused coarse nystagmoid movements in the direction of the attempted movement. Ankle clonus had disappeared on the left side. The eye grounds were normal. The functions of the viscera were normal. The treatment consisted at first of tinct. gentian co. as a placebo but was followed by iodide of potassium and strychnine.

Improvement gradually took place and by February the only symptoms remaining were impairment of the functions of the left oculomotor nerve, ataxia of the left arm and possibly slight weakness of the left leg. These symptoms persisted and when last seen in April no further improvement had occurred. There would seem to be no doubt that the symptoms were due to a toxemia of some sort and that it was gasoline would seem to be a justifiable conclusion in view of the premonitory symptoms and the absence of exposure to any other form of poison. The question might be raised whether there was either merely a functional disturbance or an actual organic lesion as indicated by the diagnosis of encephalitis. The writer believes the latter to be justified, because while most of the symptoms have disappeared, there still, after a lapse of a number of months, remained evidence of permanent damage to some functions. The writer believes that a lesion in the region of the aqueduct of Sylvius would explain the symptoms.

In the discussion which followed the exhibition of the patient at the Philadelphia Neurological Society, the tendency of acute intoxications to cause cerebellar symptoms was commented upon.

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ON THE DIAGNOSTIC VALUE OF HALLUCINATIONS: BASED ON A STUDY OF 500 CASES OF MENTAL DISEASE[1]

By A. Warren Stearns, M.D.

ASSISTANT TO THE STATE BOARD OF INSANITY, MASSACHUSETTS; PHYSICIAN
FOR MENTAL DISEASES, BOSTON DISPENSARY; INSTRUCTOR IN NEUROLOGY,
TUFTS MEDICAL SCHOOL

In most state hospitals where the usual form of admission is by regular commitment, the principal medical problem is classification according to form of insanity. At the Psychopathic Hospital (Boston, Massachusetts) the question of whether or not the patient is sane comes first of all, and, added to this, is the matter of classification. Also, it is necessary to decide these two questions in a much shorter period of time than is usually available in hospitals for the insane, as most of the admissions are for temporary care only. This condition has made it very important to seek for symptoms which are easy to detect and of differential value, because the diagnosis rests more upon the interpretation of symptoms than in following the course of the disease. This study has been undertaken with the hope that the occurrence and type of hallucinations might be made of some differential value in diagnosis.

A group of 500 cases taken in alphabetical order has been studied to see first, how many had hallucinations, next, whether they were of hearing, vision or other type, and lastly, to determine whether there were any which seemed especially characteristic of any form of disease. By taking cases in alphabetical order not only all types are included, but all periods of the hospital's work are embraced, thus excluding the influence of any particular diagnostician. It is obvious that there is no way of proving diagnoses or the presence or absence of hallucinations, so the records have been taken literally; thus any error is, at least, evenly distributed.

Table I shows the number of patients with each disease, the number of each having hallucinations and the type of these hallucinations when they occurred. Table II shows the same given in percentages.

TABLE I

SHOWING NUMBER HALLUCINATED, AND TYPE IN EACH DISEASE

Diagnosis.	No.	Present.	Absent.	Audi-tory.	Visual.	Other.
Unclassified	108	29	79	22	9	0
Dementia præcox	105	74	31	71	22	10
Not insane	65	4	61	2	2	0
Manic-depressive insanity	54	10	44	7	5	0
General paralysis	37	10	27	9	4	2
Alcoholic hallucinosis	31	31	0	30	12	4
Organic dementia-arteriosclerosis	24	2	22	2	2	0
Senile dementia	15	1	14	0	1	0
Delirium tremens	14	14	0	11	12	2
Korsakow's psychosis	14	3	11	2	2	0
Epileptic psychosis	10	3	7	1	2	0
Morphine psychosis	6	5	1	3	2	0
Miscellaneous psychosis	6	3	3	3	0	1
Toxic psychosis	5	2	3	1	1	0
Cerebral syphilis	4	1	3	1	1	0
Brain tumor	2	1	1	1	0	0
Total	500	193	307	166	77	19
Total in per cent		38.6	61.4	33.2	15.4	3.8

TABLE II

SHOWING SAME AS TABLE I IN PERCENTAGES

	Present.	Absent.	Audi-tory.	Visual.	Other.
Alcoholic hallucinosis	100	0	97	4	13
Delirium tremens	100	0	78	85	14
Morphine psychosis	83	17	50	34	0
Dementia præcox	70	30	68	21	10
Miscellaneous	50	50	50	0	17
Brain tumor	50	50	50	0	0
Toxic psychosis	40	60	20	20	0
Epileptic psychosis	30	70	10	10	20
Unclassified	27	73	20	8	0
General paralysis	27	73	24	11	5
Cerebral syphilis	25	75	25	25	0
Korsakow's psychosis	21	79	14	14	0
Manic-depressive insanity	18	82	13	9	0
Organic dementia-arteriosclerosis	8	92	8	8	0
Senile dementia	7	93	0	7	0
Not insane	6	94	3	3	0

If we take up the various diseases in order of frequency of hallucinations, Alcoholic Hallucinosis comes first. Of the 31 cases, 100 per cent. were hallucinated, 97 with auditory, 4 with visual, and 13 with other types. As the presence of visual hallucinations has been used as pointing towards the diagnosis of delirium tremens and of auditory toward alcoholic hallucinosis, these figures might be expected. Examination of the delirium tremens group shows that 100 per cent. of the 14 cases were hallucinated, 78 auditory, 85 visual and 14 other types. It is somewhat of a surprise to note the large number of this group who had auditory hallucinations. The frequency of clouding of consciousness in delirium tremens may explain the presence of visual hallucinations in this disease. Auditory hallucinations are about equally prevalent in both and given a clouding of consciousness, illusions would be more apt to occur so changing the clinical picture. This makes possible a previous contention that these two diseases are usually one and the same process when of short duration and following a debauch.[1]

The type of hallucinations in these two diseases are familiar to all, but it seems true that threatening accusing voices are common in both. Attention has also been called to the frequent occurrence of hallucinations of taste, smell and touch.

The morphine group is very similar, the one case not showing hallucinations had recovered when she reached the hospital and though delirious outside, she had no memory of her symptoms. The type was much like the alcoholic.

The dementia præcox group comes next. Of 105 cases, 70 per cent. were hallucinated, 68 auditory, 21 visual and 10 other types. In the 31 cases not showing hallucinations, 11, though they denied their presence, showed some evidence of their existence, 3 were catatonic and did not speak, 6 could not be examined because of violence or language difficulty and in only 11 cases, or 10 per cent., could it be fairly said that they were absent. This bears out the statement of Bleuler that "almost every schizophrenic in institutions hears voices."[1] Abusive and threatening voices are common to all types of this disease and when alcohol can be excluded are very characteristic. Visual, especially what Dr. Southard has called "scenic" hallucinations, are more common in the catatonic

form, while single words, meaningless sentences and impersonal conversation occur most often in the hebephrenic form.

The miscellaneous group consists of diseases occurring but once so is not available for statistical purposes. Of the 2 brain tumor cases one thought he heard the voice of a friend calling and this may have been an illusion. Of the 5 toxic cases, 2 had indefinite hallucinations which were not unusual. Of the 3 epileptics who had hallucinations, 1 had visual, 1 tactile and 1 gustatory. Twenty-seven per cent. of the unclassified cases were hallucinated, but there seems to be nothing to be gained by analysis of these.

Twenty-five per cent. of the general paralytics were hallucinated, 24 of auditory and 11 of visual type. No two of these were alike and in but 2 cases were hallucinations a prominent symptom. Only one out of four cases of cerebral syphilis gave a history of hallucinations and this one was rather indefinite. In Korsakow's disease, 27 per cent. admitted hallucinations, these usually occurring in a delirious onset.

In the manic-depressive group, but 18 per cent. were hallucinated. Thirteen per cent. of these were auditory and 9 visual, and in 54 cases but 10 had hallucinations. In none of these were they a prominent symptom and in many there is reason to doubt their existence. Seven of these 10 were manic and 3 depressed. A summary of each follows.

No. 1. Elated, said people had talked about her and that she had seen rats in her room at the hospital.

No. 2. Claimed to have seen his employer in the hospital.

No. 3. Elated and euphoric, told of wonderful vision which she had seen.

No. 4. Elated, told of beautiful vision.

No. 5. Elated, talked and argued with imaginary companion.

No. 6. Elated and hyperreligious, claimed to have had communication from God.

No. 7. Elated, told of beautiful bird she had seen.

No. 8. Depressed, thought family had talked about her.

No. 9. Depressed, jumped out a window and afterwards said a voice had said, " Why don't you jump ? "

No. 10. Depressed, thought she heard her family laughing at her.

It seems quite possible that these supposed hallucinations in the manic cases are but expressions of their elation and plays of fancy,

and that those of the depressed cases are but illusions due to
their anxious state of mind. The infrequency of hallucinations
is often mentioned in the literature. Remond, referring to mania,
says, " Rarer still than delusions are hallucinations. . . ."[2] De-
Fursac, " Hallucinations are rare and fleeting."[3] Diefendorf,
" Hallucinations are rare, except in the delirious form of the manic
phase and in the more marked stuporous depressions, but even
here they are neither a prominent nor persistent feature. Further-
more, the hallucinations do not have the same sensory distinctness
common to the sense deceptions of dementia præcox."[4] G. Deny
and Paul Camus, " The existence of true hallucinations in the
course of depressed states is a rare phenomenon. There are more
often illusions and false interpretations of real sensation." And
in the manic states, they speak of hallucinations and illusions as,
" rare and usually ephemoral." Also, " Illusions are more com-
mon, especially illusions of memory."[5]

Kraeplin[6] states that false perceptions are not often in the
foreground of the manic-depressive picture, but that they do occur
in many different forms of the disease. These false perceptions
are illusions rather than hallucinations and are favored by the
imperfect fleeting perceptions and lively emotions of the patient,
and in point of fact always correspond to his thoughts and mood.

True hallucinations also occur, especially by night though also
by day, as a rule somewhat startling visions of faces and various
forms and objects in the midst of whatever patient is lookinig at
(e. g., a wall or door), or also auditory, somewhat ill-defined and
fragmentary statements suitable to the mood of the patient (who
can rarely repeat the exact words, as might a victim of dementia
præcox or alcoholic hallucinosis).

Stransky[7] states in his monograph on Manic-Depressive In-
sanity that although hallucinations occur in the exalted phases of
manic-depressive insanity, yet they do not form a typical symptom
thereof, are completely lacking in the majority of cases and hardly
dominate the picture, except in those delirious conditions which
are counted by many authors as belonging to manic-depressive
insanity. On the other hand, Stransky states that hallucinations
play a far greater part in the depressive phases of manic-depress-
ive insanity and at times, he believes, in delusional states or in
apprehensive agitation which is sometimes found in the depressive
phase of manic-depressive insanity. Illusions or hallucinations,

as a rule, in the form of voices, are not infrequent. The content of these voices is either closely akin to the dominant emotional and intellectual state or else it forms a very sharp contrast thereto. In the latter event, these voices are in the form of imperative ideas, as it were, expressed aloud.

Stransky states that hallucinations of irrevelant nature are very rare and perhaps do not occur in cases in which the diagnosis is beyond suspicion.

Ziehen[8] states that mania, a form of the affective psychoses, exhibits in many cases no disorder in the sensory field, nor is there any remarkable lowering of the threshold of stimuli. He states that perhaps one fifth of these cases exhibited hallucinations, as a rule, of vision, characterized by manifoldness and mobility, with moving animals and landscapes. Gustatory, olfactory and tactile hallucinations occur very infrequently. Illusions are perhaps more frequent than hallucinations and among illusions those of visual type are most frequent.

Ziehen goes on to say that very young patients or very old patients, as well as alcoholic and hysterical persons, exhibit a pre-disposition to hallucinations and illusions. Ziehen classifies as one form of mania that in which there are numerous hallucinations and terms this form *mania hallucinatoria*.

Of course it remains a question how far Ziehen's mania corresponds with the maniacal form of manic-depressive insanity, according to Kraepelin. Ziehen states that about 90 per cent. of these manias recover, that about 5 per cent. of them die, that about 4 per cent. exhibit a permanent defect of intelligence; that occasional cases are transformed into a disease which he terms *secondary hallucinatory paranoia,* and that a few cases, very especially senile cases, are transformed into cases of *chronic mania.*

Ziehen does not reckon among these manias those which are partial phases of periodic or circular insanity. He states that the post-maniacal occurrence of hallucinations and delusions, *without* underlying intelligence defect, is very rare.

But eight per cent. of the arteriosclerotics, or two out of twenty-four, were hallucinated. One of these was delirious and the other saw people who told him to do things. One of the cases of senile dementia thought he saw a negro on the shelf in his room.

Hallucinations occurred least frequently of all in the not-in-

sane group as only six per cent., four out of sixty-five cases, were so affected. Of these:

No. 1. An hysteric, heard buzzing and thought she heard her name called.

No. 2. An hysteric, heard some one crying, "Stop."

No. 3. A child, saw ghosts at night, probably pavor nocturnus.

No. 4. A child, saw frightful and fantastic figures at night, pavor nocturnus?

These figures are somewhat at variance with those of Gurney[10] He asked the following question of 27,737 supposedly normal people: "Have you ever, when believing yourself to be completely awake, had a vivid impression of seeing or being touched by a living being or inanimate object, or of hearing a voice, which impression, so far as you can discover, was not due to any external physical cause?" 11.96 per cent. answered in the affirmative, by which he inferred that that per cent. of normal people had had an hallucination. Parish[11] objects to the fact that most writers use only morbid conditions in studying hallucinations. Nevertheless there seems to be very little in common between the hallucinations occurring as symptoms of insanity and the false perceptions alluded to above, and actual hallucinations point pretty strongly to mental disease.

The following conclusions may be drawn from this work:

1. The presence of hallucinations is indispensable for the diagnosis of alcoholic hallucinosis or delirium tremens, but the type of hallucinations is not a proper criterion for differentiation between these diseases.

2. The frequency of hallucinations in dementia præcox and their rarity in manic-depressive insanity has a bearing on differential diagnosis (provided that Psychopathic Hospital criteria are sound for these two diseases).

3. There are some grounds for doubting the existence of true hallucinations in manic-depressive insanity.

4. Hallucinations seem to be rare in sane persons, even though they be psychopaths.

1. Bleuler. Schizophrenie, p. 78.
2. Remond. Maladies mentales, pp. 76 and 192.
3. DeFursac. Trans. by Rosanoff, Outline of **Psychiatry, pp. 348, 453,** 356.
4. Diefendorf. Clinical Psychiatry, p. 383.

5. G. Deny and Paul Camus. La Psychose Maniaque-Depressive, pp. 40
     and 45.
6. Kraepelin. Psychiatrie, Vol. III.
7. Stransky. Die Manisch-Depressive Irresein, p. 15.
8. Ziehen. Psychiatrie, pp. 364–365, and p. 392.
9. Tuttle. Am. Jour. Ins., Jan., 1902.
10. Gurney. Phantasms of the Living. Quoted by James and Tuttle.
11. Parish. Hallucinations and Illusions, preface.
12. James. Psychology.

Society Proceedings

FORTIETH ANNUAL MEETING OF THE AMERICAN NEUROLOGICAL ASSOCIATION

Held at Albany, N. Y., May 7, 8, and 9, 1914

The President, Dr. Henry Hun, in the Chair

THE CORTICAL CONNECTIONS OF THE RED NUCLEUS

By LaSalle Archambault, M.D.

Lantern slide demonstration of several cases, illustrating well-marked secondary degeneration of the red nucleus in lesions involving circumscribed areas of the cerebral cortex. The distribution and intensity of the degenerative reaction vary with the topography of the causative lesion. The red nucleus receives fibers from the temporal lobe, the frontal lobe and the rolandic region.

Dr. C. K. Mills thought this paper was most interesting because of its bearing upon certain broad generalizations with regard to the organic basis of the cerebral affective motor apparatus. In his own paper he discussed this subject more fully and therefore would say very little about it here. The red nucleus holds a special position in this cerebral affective or tonectic apparatus, forming the connecting link between this cerebral tonectic, the cerebral voluntary motor, the cerebello-rubro-thalamic and the cerebello-rubro-spinal systems.

Dr. Mills said he had never had the opportunity of seeing a better demonstration or listening to a better paper designed to elucidate some of the important but obscure problems of cerebral structure and function.

Dr. Arthur Schuller, of Vienna, gave a demonstration on the Roentgenology of Epilepsy.

Dr. T. M. T. McKennan, Dr. Geo. C. Johnston and Dr. C. H. Henninger, read a paper with the title: Observations on Epileptics, Chiefly from an X-Ray Standpoint. (See this Journal, 1914.)

Dr. Sachs said with reference to the remarks of Professor Schuller, one question occurred to him, whether particularly in case of brain tumor he would be inclined to attach any importance to the evidences through the X-ray picture of the enlargement of blood vessels and slight separation of sutures. Whether there would be enough in that sort of evidence to make it of value in the diagnosis of intracranial tumor. We have seen plates with such changes and there has generally been a division of opinion whether that passed beyond physiological limits.

Dr. McKennan said they had examined fourteen of these cases for sugar tolerance. All of these were in the hospital as it is difficult to examine for sugar tolerance unless one has complete control of the patient.

They found increased sugar tolerance in all fourteen cases. This they considered suggestive of hyperpituitarism.

The special point they endeavored to bring out was the fact of the bony changes at the base of the skull and they studied, very often for hours at a time, the X-ray plates and tried to avoid using their imagination in reaching conclusions. It seemed to them that it may take a good many more observations to determine this matter. Their findings seemed to be very suggestive and the fact of the increased bony deposit in itself seemed to be the significant thing. The amount of bony deposit has not so much importance as the fact that there exists an increase in the amount of bone in the region around the pituitary gland.

Dr. Johnson said in some 200 cases they had never found any of the calcareous deposits which Dr. Schuller had been so fortunate as to find.

PHYSIOLOGICAL CHARACTERISTICS IN INSANITY

By S. D. W. Ludlum, M.D.

An analysis of the physiological symptoms that are seen in insanity, regardless of the psychological diagnosis and an arrangement of the cases, studied according to physiological and biochemical investigations.

The similarity of this arrangement with the syndromes as seen in experimental and pathological work on the ductless glands.

Clinical and laboratory methods of observing treatment.

Dr. Knapp asked Dr. Ludlum whether he took into account the stage of the disease in the cases of dementia præcox.

FLEETING ATTACKS OF MANIC DEPRESSIVE PSYCHOSIS

By Menas S. Gregory, M.D.

The literature dealing with transient attacks of Manic Depressive Psychosis is very meager.

Such short attacks are more frequent than the protracted ones requiring hospital treatment, and may last from a few hours to several days. Quite often the condition is not recognized unless accompanied by accentuating etiological factors, especially that of alcohol, which frequently masks the picture. A great majority of periodic drinkers, and especially so-called " pathological drunkards," are really examples of short attacks of Manic Depressive with alcohol.

Short attacks of mild type unaccompanied by alcohol are frequently mistaken for transitory mental conditions of other character, such as hysteria, psychic epilepsy, etc.

These attacks may be associated by the patient with somatic disturbances, and are frequently regarded by the general practitioner as migraine, neuralgia, nervous dyspepsia, nervous heart, liver, etc.

Dr. C. B. Burr said cases wherein the attacks are much longer than those the Doctor mentioned in his paper offer great difficulty in diagnosis. He had in mind the case of an inebriate where the symptoms due to withdrawal of alcohol so overshadowed those of the disease itself, a manic-depressive state, that it was difficult to arrive at a correct conclusion. However, the case was correctly appreciated in the end. He never saw

the patient in a period of excitement, but while under care the irritability and opposition, and the call for stimulants were so much in evidence that self-disparagement, hopelessness and other symptoms of the psychosis were crowded into the background. After he went away from under care, Dr. Burr received a letter from him which indicated that he was undergoing a period of excitement and since coming to this meeting, he had heard he committed suicide.

THE PSYCHOSIS OF ADOLESCENCE

By J. Montgomery Mosher, M.D.

The mental characteristics of adolescence; relations of the mental and motor mechanism of the brain to thought and action; type of abnormal action due to cerebral exhaustion; illustrative cases; prognosis; prophylaxis; results; conclusions.

Dr. Diller recalled a patient who had been under his observation many years ago, before dementia præcox had been invented, which was in many ways similar to that related by Dr. Mosher. This patient was an adolescent youth who lay in a catatonic state for a period of 18 months during which time he was entirely mute. His arms and legs placed in any position remained so indefinitely and he was apparently oblivious to his surroundings. A fly on his conjunctiva failed to produce the ordinary reflex movement. For months he was fed with a nasal tube. One morning he talked and began to move about a little. By the end of the week he was apparently entirely well. He recalled many incidents which had occurred during his illness; happily for his caretakers, he had no adverse criticisms to make of the physicians and nurses. For three or four years following his recovery Dr. Diller occasionally met this man on the street going about his business like any one else and had a little chat with him.

Dr. Mosher's discussion of the psychology of such a case is interesting and it may be adequate; but as hindsight is better than our foresight, Dr. Diller doubted very much whether armed with such knowledge we could with any degree of certainty predict recovery of similar cases. However, since his experience in this case he had never been willing to give up hope utterly for catatonic patients.

ORGANIZATION OF NEUROPATHIC AND PSYCHOPATHIC HOSPITALS WITH REFERENCE TO MEDICAL TEACHING

By Richard Dewey, M.D.

I. It is recognized that schools of medicine should give the student-body instruction in Psychoneuroses and in Psychotherapeutics.

II. Clinical instruction requires hospitals with wards similar to " Pavilion F," at Albany, or separate institutions. A rough classification will show the immense range of cases belonging to the Psychopathic Hospital: First, the psychoses in all their infinite variety. Second, the neurasthenic and hysterical. Third, the additions to drugs and alcohol. Fourth, the organic brain lesions, paralytic, paretic, arterio-sclerotic; those psychoses resulting from cardiac and renal diseases. Two great subdivisions would be the surgical and the syphilitic groups (many patients

would belong to two or more of the above groups). Fifth, the fever deliria. Finally, two important groups that psychiatry must take cognizance of, but requiring separate provision, the epileptic and the criminal, psychopaths.

Dr. Mosher said Dr. Dewey had compressed a great deal of information into a very small compass and summarized the important facts of this matter in such a concise manner we hardly realize how much ground he has covered in his digest. His own experience is principally with the annexation of a ward for mental cases to a general hospital. He had found after several years of administration they were attaining an ideal and as a general thing leveling out, so that as years go by there is less and less distinction between mental cases and cases of general disease. Patients who may come into the mental wards by reason of mental states incidental upon other conditions do better in a day or two than in the general ward. So they receive a great many cases for a day or a week or two, following an operation, and incidental upon their so called physical diseases. Of course the gratification rests in the discovery of the intimate relation between so called physical diseases and mental diseases as they have been called in the past and the more widely that idea is appreciated and the conditions are adapted to meet it the more easy and more rational will become their method of dealing with these cases. That is the point in Dr. Dewey's paper on which he touched and which Dr. Mosher thought should have emphasis.

III. The Psychopathic Hospital requires laboratory facilities, chemical, bacteriological and psychological.

IV. The question of legal commitment is here vitally concerned. Is a modification of legal procedure practicable whereby official interrogation will determine whether any individual is deprived of personal liberty, without affixing the mark of socalled insanity upon one and all?

V. Insanity is a medical misnomer.

Dr. C. B. Burr said the question of commitment is an interesting one. From motives of expediency, it is oftentimes necessary to consider more than the apparent rights of the individual. It is very comforting to a patient to know, after recovery, that there has been no adjudication of insanity and as time goes on, commitments will become fewer and fewer no doubt. On the other hand, a great deal of trouble is often escaped by early commitment.

Dr. Burr mentioned a case where a woman patient was spirited away in an automobile between two days, by her daughter, and taken to her home. Since then she has commenced proceedings for divorce, and this notwithstanding there was adjudication of insanity in Michigan. There was none in her home state and she seems to have gained the first round in legal proceedings. She has been granted alimony *pendente lite*, and apparently has full standing in court. What the future may develop, whether she will still continue to have right in court, it is of course impossible to predict, but it is obvious that had there been adjudication of insanity in her own state much trouble would have been escaped by those certainly innocent of any wrong intention in the course they adopted for the care of the patient.

PULMONARY COMPLICATIONS OF APOPLEXY.

By Philip Coombs Knapp, M.D.

Pulmonary complications add to the gravity of the prognosis in all cases of apoplexy, and are much more frequent in the fatal cases than in those which recover. Two chief types of pneumonia, the hypostatic and the inhalation forms. Neither seems to have any relation to the side of the body paralyzed, both lungs usually being affected. Prophylaxis of some importance. Danger of change of position much exaggerated.

Dr. Knapp said he had left out in his presentation of this matter the emphasis upon the mechanical production, supposing it to be obvious to the Association. Some of Dr. Mills's recommendations in regard to the conduct of the case, etc., were made by one of our honorary members many years ago in an article by Dr. Edes in Pepper's System. Dr. Knapp perhaps had studied Dr. Mills's book rather too hastily, but he did not think he had emphasized in his book as much as he does now the importance of frequent changes in position. Dr. Knapp thought Dr. Mills is in error when he recommends turning patients upon the paralyzed side, because the paralyzed side certainly has a little less action in very many cases than the sound side, and it increases the blood upon the paralyzed side by the respiratory muscles acting against the weight of the patient and there would naturally be less free respiration. As to the necessity of extreme care in turning, which Dr. Mills has spoken of, Dr. Knapp could not see the importance of it. Furthermore, another point which Dr. Mills has not touched upon, the importance in early stages of getting the patient in a better position to offset the action of gravity than can be gotten by the ordinary head rests, because with such head rests the body slides down toward the bottom of the bed and the patient is kept in a cramped position. Therefore, Dr. Knapp spoke of the advantage of getting them out of bed and in a sitting posture because in that way they can breathe better. He felt certain that in all stuporous cases—fracture of skull, alcoholic wet brain, apoplexy—there is an improvement in the cerebral condition by getting them actually out of bed and into a chair, and he had never seen harm come of it.

CONTRIBUTION TO THE GROUP OF HEREDITARY DISEASES: PROGRESSIVE GLOSSOPHARYNGEAL PARALYSIS WITH PTOSIS

By E. W. Taylor, M.D.

Report of a family in which, after the age of fifty, a slowly developing paralysis of the muscles of deglutition takes place, with coincident ocular ptosis, but without other involvement of cranial nerves. Death from starvation. So far as possible to ascertain, the disease first appeared in the mother of the patient described. In the patient's generation, two brothers, a sister, together with the patient, have been victims of the affection. Three have died, and the patient is now suffering from marked ptosis and considerable difficulty in deglutition. Another sister is still living.

Dr. Camp said he understood that, in this case, there was no atrophy and it appeared to him that the symptoms somewhat resemble those seen in the asthenic type of bulbar palsy.

Dr. Taylor said Dr. Spiller asked whether Dr. Taylor had been able to examine other members of the family. This he had not been able to do so far as this generation is concerned, since with the exception of one sister in Canada, whom he hoped later in some way to be able to learn more about, they are all dead. This sister is reported to be still well; but owing to her reticence, it is difficult to get absolute facts. Dr. Taylor was interested in what Dr. Spiller had to say regarding the question of ptosis. This in itself is not particularly remarkable, but in combination with the glossopharyngeal paralysis constitutes a grouping which is apparently unique. None of the other cranial nerves in the case which he had carefully examined are in any way involved. The knee-jerks are perfectly normal, as are the other reflexes of the lower extremities. There is, therefore, no evidence whatever of involvement of the pyramidal tracts. There had been no other diseases of a motor sort in the family so far as ascertained. With regard to Dr. Camp's suggestion, that possibly the condition is one of myasthenia gravis, it may be said that this is altogether improbable because of the unique and constant localization of the paralysis in many members of the family, because the affection is steadily progressive, and because in no other regard does it in any way resemble myasthenia. Furthermore, the fact that it occurs only after the fiftieth year is strongly against the hypothesis of a myasthenia, as is also its manifestly hereditary or family character. Even were it to be included in this group, it would be none the less remarkable on that account. The condition is presumably a degenerative one, doubtless involving the nuclei of certain cranial nerves, analogous perhaps to progressive bulbar palsy, but differing in the nerve involvement, which so far as Dr. Taylor was aware has not hitherto been described.

THE PATHOLOGY OF TABETIC OCULAR PALSIES

By William G. Spiller, M.D.

Difference of opinion exists as to the nuclear or nerve origin of tabetic ocular palsies, and a distinction is made in the pathology of the ocular palsies of tabes and brain syphilis. The author has studied with microscopical serial sections a case of complete ophthalmoplegia in tabes. The subject brings into consideration the relation of parasyphilis to syphilis.

Dr. Fry asked whether in these third nerve palsy cases there is not more pain in the " syphilitic " ones than in those we have been in the habit of calling " post-syphilitic " from a clinical standpoint.

Dr. Fisher asked Dr. Spiller, as in many cases of tabes we have these early ocular palsies which just as in syphilis disappear and often never return, whether that fact does not indicate that the lesion affects the nerve roots rather than the nuclei.

Dr. Spiller thought that the so-called parasyphilitic affections of the brain are of more chronic type and therefore less likely to be with pain but many of the " syphilitic " ocular palsies are painless.

He believed a complete recovery would be more probable from a nerve lesion, but of course recovery is possible from nuclear lesions if they are not too severe, as is seen in poliomyelitis.

MUSCLE TONICITY, EMOTIONAL EXPRESSION AND THE CEREBRAL TONECTIC APPARATUS

By Charles K. Mills, M.D.

Dr. Mills first said that since he had sent the announcement of his paper to the secretary some month or two before the meeting he had changed the title in the course of the development of the article. At first this title referred primarily to one of the most dramatic symptoms exhibited by the patient—involuntary painful emotional expression—but his further studies of the case and of the literature of the subject had caused him to expand the scope of his paper for presentation and publication. One of the fundamental ideas in this paper was that of the existence of a special cerebral tonectic apparatus. This on its motor side is extra-pyramidal. He held in his paper that tone derived from sensation and idea has in the cerebral cortex a special rendezvous. He believed that this was largely midfrontal and prefrontal and more highly developed in the right cerebral hemisphere.

Motor centers of the cortex cephalad of the central fissure had cellular tonectic annexes which together composed a tonectic or tonecto-motor zone. By association tracts this tonectic area was connected with the striatum so that its impulses here grouped could be delivered from the strio-thalamic system en masse by way of the cerebello-rubrothalamo-cortical system on the pyramidal motor apparatus. In this way the tone necessary to the steadying of synergic motor activity was acquired for normal movement. When this rhythmic tonectic influence was withdrawn—by large lesions of both lenticular nuclei for instance—the cortical tonectic centers released from their striate connections discharged directly by gyral associating tracts on the cortical motor centers and thus arose the phenomena of hypertonicity, or perhaps it might be better to say of irregular tonicity.

Dr. Mills believed that the caudatum was more especially concerned with the tonectic phenomena of the autonomic or sympathetic nervous system and that its influence was exerted by way of the nucleus ruber and the cerebello-rubro-spinal tract.

The paper contained numerous observations on a case of bilateral caudato-lenticular degeneration or destruction with a microscopic study by Dr. Spiller of the secondary degenerations resulting. In the first place, the patient exhibited to a very large extent the symptom-complex of Kinnier Wilson's bilateral lenticular degeneration—involuntary emotional expression, hypertonicity, tremor, involuntary movements, contracture attitudes, dysarthria, dysphagia, some mental reduction and, late in the case, rigidity. Sensory symptoms were entirely absent. While the deep and superficial reflexes were very prompt, the Babinski extensor phenomenon was not present on either side.

In addition to this lenticular syndrome the patient exhibited vaso-motor phenomena especially showing themselves in a congested appearance of the face. The temperature ran for months a degree or so below the normal, and respiration and pulse were in excess of normal rates. There was some irregular or peculiar impairment of control of the bladder and bowels.

Besides the symptoms just enumerated the patient had a few others of pyramidal type, the necropsy and pathological examinations showing limited involvement of the posterior limb of the internal capsule.

Dr. Mills discussed to some extent the literature of the subject of muscle tonicity and emotional expression and called attention to the records of some cases of large lesions of the midfrontal and prefrontal areas of one or both hemispheres in which phenomena somewhat similar to those produced by large striate lesions were present.

He held that tone as exhibited in man was a cerebral cortical function and that the three great elements represented in normal and abnormal movement were energy derived through the pyramidal apparatus, synergy from the cerebellum, and tone through the cerebral tonectic apparatus.

Dr. E. M. Williams said he had recorded a case of paresis, in his paper at this meeting, in which there was an incomplete left hemiplegia clearing up in the course of the day, the right side then becoming affected and clearing up with a later involvement of the left side. In addition there were generalized myoclonic twitchings, on the third day beginning to affect the face so that the facial muscles on the left jerked two or three times per second. During periods of about a half to two minutes what seemed to be outbursts of laughter occurred and during these the patient made peculiar grunting sounds.

The patient died and Dr. Williams could not get a necropsy. He thought it interesting as possibly further affirming the James-Lange theory of the dependence of emotion upon the motor stimulation. Whether the emotional outbreaks were primary in this case or secondary to the facial movements could not be decided.

THE IMPORTANCE OF THE BONY SINUSES ACCESSORY TO THE NOSE IN THE EXPLANATION OF PAIN IN THE HEAD, FACE AND NECK

By M. A. Bliss, M.D.

Not infrequently are pains in the face, head and neck treated for long periods with various internal remedies when the explanation lies in the accessory sinuses, and the ganglia and nerve trunks adjacent thereto.

A rather clear symptom complex springs from the district of the spheno-palatine ganglion, and alcohol injected therein cures it.

Incessant nuchal pain springs from the post ethmoidal sphenoidal district. Pronounced headache, dizziness, nausea and optic swelling arise also from this field. Cases illustrating these statements will be cited.

The ordinary casual examination of the nasal district does not suffice in this work.

The rhinologist must make numerous and painstaking examinations before the field under consideration may be excluded.

Dr. Hecht said this paper calls attention to manifestations which are too frequently accepted by physicians and neurologists as well, as expressions of a neurosis. This point of view, he thought, arises from the fact that the chief complaint—that of pain—is so long protracted, troublesome and resistant to treatment. In cases, for instance, of supraorbital neuralgia associated with frontal sinus infection, where all traces of pus have disappeared, the mucosa continues to present a chronic inflammatory appearance and the neuralgia continues in the presence of this slight evidence of pathology. In short, the presence of pus is not necessary to the inference of cause and effect. Neuralgias are readily superimposed upon pyogenic infections long after all traces of pus have disappeared.

In addition to the neuralgias, Dr. Hecht called attention to the myalgias that so frequently follow in the wake of infections and sometimes locate at points quite remote from the original source of infection. He had observed several instances of nuchal muscle pains and occipital neuralgias which he felt could be definitely traced to infections of tonsil crypts and pyorrheal pockets.

Arthritic manifestations following these sinus infections are not at all uncommon.

After all, it is a matter of a low grade of sepsis, with shifting areas, at times sharply circumscribed, of pain or tenderness of muscles, nerves and joints.

In the course of their chronicity, he had known patients to get much depressed as the result of the nagging, distressing, degree of the pain resulting from these sinus infections. At times, these supraorbital neuralgias behave much like the attacks of migraine that have their onset in and above the orbit, and particularly in one young woman whom he saw very recently, and who was known to have a migraine for years, it was difficult to differentiate the supraorbital type of neuralgia which followed a long standing frontal sinus infection.

Dr. Hecht asked Dr. Bliss what use he had made of autogenous vaccines for these complications, and, if any, with what result.

Dr. Fry said the study of some of these cases is difficult indeed, requiring great patience on the part of the rhinologist. Everyone of them should be watched by a neurologist, as well. Dr. Fry was familiar with the work Drs. Sluder and Bliss had been doing and with some of their cases. It seems there is much promise in it.

Dr. Bliss said in response to Dr. Hecht's question they had not used autogenous vaccines.

RECURRENT MENINGITIS, DUE TO LEAD, IN A CHILD OF FIVE

By H. M. Thomas, M.D., and K. D. Blackfan, M.D.

Boy, five years old, admitted August 22, 1913; comatose, slight fever, headache, convulsions, vomiting, rigidity of neck, strabismus, unilateral choked disc with hemorrhagic retinitis, etc. Von Pirquet negative; leucocytosis 27,600; Wassermann in blood negative. Lumbar punctures. Clear, sterile fluid, 20 to 40 cells; Noguchi positive; Fehling solution reduced; Wassermann negative.

Improvement rapid; in 11 days seemed nearly well. Discharged September 20, in good condition. Eyegrounds normal. Child kept under observation. Condition remained good for five months. January, 1914, severe nose bleeds.

Re-admitted to wards, March 3, 1914, after three days of headache, vomiting, stiff neck, and 12 hours of coma and convulsions. Condition quite similar to that on first admission. Wassermann in fluid positive with other antigen.

Typical lead line discovered.

R. B. C., 4,480,000; W. B. C., 23,100; hemoglobin, 55 per cent. Marked stippling of white cells. (Grawitz granules.)

Source of lead discovered in child's habit of eating paint from bedstead. Discussion of case. Lead probably a more frequent cause of intra-

cranial disease than is usually recognized. Interest of the French in meningitis due to lead. Hardly noted in German, English and American literature.

Dr. Bliss said they had a large lead district near St. Louis and this paper reminds him of the fact that in the manufacture of lead, and products of lead, they had always an extraordinary number of cases of epilepsy. Dr. Thomas did not mention in his paper whether this child under his care had repeated convulsions, but they had been accustomed to look for lead poisoning in epileptics. Especially in those who work in the lead industry.

Dr. Allen called Dr. Thomas's attention to a report by Dr. Spiller on meninginal involvement due to lead poisoning.

Dr. Thomas said he knew of Dr. Spiller's case of lead encephalopathy in which were found, among other lesions, small cell infiltration of the meninges. This interesting case and other similar cases have been collected in a German thesis.

The cases referred to by Dr. Bliss are most interesting, and it would be important if in them the lumbar puncture revealed irritation of the meninges.

Dr. Edward M. Williams read a paper with the title: "Paramyoclonus Multiplex, Including a Case With Necropsy Showing Lymphatic Infiltration of the Pia." (See this *Journal,* 1914.)

Dr. Starr said he would hesitate, of course, to throw any doubt on the diagnosis of the case reported, but it differed so essentially in all its particulars from the well-marked group of cases of paramyoclonus that it seemed to him a little questionable whether it should be assigned to this class. The peculiarity of the spasm in paramyoclonus is that it is confined to muscles connected with the trunk, there being no spasm in muscles not connected with the trunk, such as hands or toes. Very frequently in paramyoclonus there is a history of functional nervous disturbances which in the course of time gradually pass off. Dr. Starr did not think there is any case on record where a disturbance of speech has been a marked symptom. He did not think in the literature on the subject with which he was thoroughly familiar, there had been any record of epilepsy in paramyoclonus. He had seen quite a number of these cases and they did not correspond to the case described by Dr. Williams.

Dr. Williams said he thought the case was rather doubtful. That was one of the reasons he reported it as he could not classify it definitely as one thing or the other, but it seemed to be nearer paramyoclonus than anything he could think of.

He realized the fact that the movements of paramyoclonus multiplex are supposed to be confined to the trunkal muscles. He believed, however, that the arms were involved in the earlier reported cases.

What he meant to bring out particularly was the fact that these cases either are hysterical or symptomatic of some other disorder, and he could not see why they should be classed as definite clinical entities.

The case in his paper referred to by Dr. Hun was not a purely hysterical case, but one of unmistakable epilepsy, with an additional hysterical element.

UNILATERAL HYPERTROPHY OF LIMBS. REPORT OF A CASE

By Howell T. Pershing, M.D.

Girl, aged 20. Mother had Raynaud's disease. Greater size of right limbs first noticed at 3 years. Difference has gradually increased, most rapidly at puberty. Mental development normal. Increased size principally in thickness of subcutaneous tissue. Measurements, photographs and radiographs. Theories of pathogenesis.

Dr. Allen called Dr. Pershing's, as well as Dr. Moyer's attention to the fact that not only does this process involve the soft tissues but that by his measurement of the X-ray picture with an accurate metal rule Dr. Allen found quite a difference in the diameter of the tibia. The difference in diameter amounting in one place to 4 mm. and in another place to 7 mm. This means a discrepancy in circumference too great to be left out of consideration.

Dr. Peter Bassoe, Chicago, stated that he regretted that Dr. Pershing uses the term unilateral hypertrophy of limbs rather than trophedema. In the small but well-defined group of cases hitherto reported as unilateral hypertrophy, or hemihypertrophy, there has been a distinct hypertrophy of all the tissue elements on the affected side. Thus in the case reported two years ago by Dr. Bassoe, not only were the extremities longer on the affected side, but the circumference of the chest was greater, the teeth and gums were larger and the nostrils were larger on the hypertrophic side. In the reported necropsies, the last case being that of Cagiati, the paired organs have also been found larger on the hypertrophic side. It would, therefore, appear preferable for the case just reported by Dr. Pershing to be grouped under the heading of the trophedema of Meige.

Dr. Archambault said there was a certain discrepancy between the bony development on the two sides. In the photographs of the chest there was a very decided difference between the sternal portions of the clavicles and the resulting prominence of the sterno-clavicular joint on the affected side is most striking.

Translations

VAGOTONIA

A Clinical Study

By Privatdozent Dr. Hans Eppinger and Dr. Leo Hess

OF VIENNA

Translated by Walter Max Kraus, A.B., M.D., and
Smith Ely Jelliffe, M.D., Ph.D.

It is remarkable that we often find some evidence of a persistence thymus. Many vagotonics are of lymphatic constitution, as shown by the enlarged tonsils, large lingual follicles, as well as the solitary lymph nodes of the tongue, and by the condition of the lymphatic apparatus of the conjunctiva. Occasionally rectoscopic examination will reveal large lymphatic follicles on the rectal mucous membrane. As has been stated the tonsils are large, pale pink and much pitted.

We know full well that associated with the lymphatic constitution and persistent thymus is a diminution of the resistance to infection. The vagotonic also has a tendency to colds and other infections, and when infected has but very little resistance. Later on we shall discuss the possible etiological relationship between thymus persistence, the lymphatic constitution, and the vagotonic constitution. We may say at this point, however, that on X-Ray examination we have been able to find a narrow aorta in a group of our vagotonic cases. We not only found anemia in this group of cases but also in vagotonics in general. The criterion for this was not alone the facial color, but the additional evidence of a blood examination. In fact a marked grade of anemia is quite characteristic of the vagotonic constitution.

When we discover that vagotonia is associated with so many other constitutional anomalies, which are manifestations of inferiority, we naturally are inclined to ask whether vagotonia itself is

not a form of constitutional inferiority. That this view is true is strengthened by the fact that vagotonia is so frequently found in classes of people who show signs of degeneration, as, for example, Polish Jews.

Our contention that many diseases are related to the vagotonic constitution and that certain signs and symptoms are only produced when the proper soil is present admits of certain exceptions. As examples of this are certain cases of typical general vagotonia, associated with hyperacidity, diminished peristalsis and diminished gastric tone. It is also well known that spastic constipation, which is so frequent a finding in connection with these signs of autonomic stimulation, may be associated with gastric atony. There are some cases in this group in which the gastric secretion is diminished. Finally tachycardia is often found present, while the gastro-intestinal tract and other visceral organs show signs of autonomic hyperactivity. These facts raise the question, can vagotonia exist in some parts of the visceral nervous system, while the reverse exists in others? Before entering into a discussion of this matter, we must outline our definition of vagotonia very sharply, and we must state that if we should find signs or symptoms which are significant of autonomic stimulation, as, for example, gastric hyperacidity, or nervous diarrhea, we would not feel justified in making vagotonia responsible for this symptom, without further inquiry into the case. For this symptom may be due to some organic condition, just as bradycardia may be of organic origin. Furthermore the symptoms referable to various organs, which are signs of autonomic stimulation, must have been spontaneously produced and not have been brought out by the action of drugs.

Thus we may say that vagotonia is a purely functional disease, not referable to any organic basis, which does not affect one organ alone, but spreads out, even if but transiently, in several branches of the autonomic system, until finally it involves them all and affects the entire autonomic system.

This definition of the condition as a functional disease narrows down the number of diseases which when having signs of autonomic stimulation might be considered as vagotonic. Looking at the matter in this way we are not inclined to consider every spastic state of the autonomic nervous system as a part of general vagotonia, even though it may be referable to autonomic stimulation,

for if we did this and went so far as to say that every spastic
state, which was in any way related to the vagus, was a sign of
vagotonia, we should have to divide all people into the vagotonic
and sympathicotonic, a procedure which would lead us too far
afield. On the other hand if we did try to enlarge the narrow
limits we have set for vagotonia and added to the not infrequent
cases of this condition those which showed some signs which
through being opposite to what was expected, spoiled the picture,
it would but serve to increase the interest in this most impor-
tant constitutional anomaly and throw more light upon visceral
neurology.

Since true vagotonia may be associated with diseases of other
etiology, organic or functional, certain groups of symptoms may
appear in a given case, some of whose individual components will
not fit into the picture of generalized vagotonia. Enteroptosis
is very often associated with vagotonia and may be the cause of
symptoms quite different from it. The tone of the organs within
the abdomen, as, for example, the stomach, receives considerable
aid through that of the abdominal wall. Should this latter be
absent the smooth muscle cells are robbed of a valuable support.
Vagotonics are just the class who, in connection with the symp-
toms of autonomic hyperactivity, suffer from various other com-
plaints and pains, a fact which readily leads the patient into a
state of malnutrition. The malnutrition affects the entire body,
and this may affect the smooth muscle cells of the stomach. In a
group of cases we saw that increase of the state of nutrition and
general constitutional improvement bettered not only the gastric
tone but also the secretory activity of the stomach.

Further difficulty in making a clear cut diagnosis of vagotonia
is found in the symptom, tachycardia. This, we believe, is pres-
ent in some cases due to enteroptosis, a relationship, which is most
striking in cases of " cor pendulum." These people, who in every
other way are true vagotonics, usually have a normal pulse rate
when they are recumbent and breathing normally. However, the
slightest exertion,—a tachypnoe of nervous origin for example—
may cause a transient dyspnea which is augmented by the in-
creased tone and relative narrowness of the bronchial branches.
In enteroptopic individuals with long thoraces, this is followed by
a very low position of the diaphragm, which in time, separates
the heart from it proper support. This low position of the dia-

phragm, as well as changes in the position of the heart itself, are surely sufficient cause of a compensatory tachycardia. If one considers furthermore that secondary anemia is frequently present, and that autonomic stimuli may appreciably alter the distribution of the blood, it is scarcely to be wondered that this most important organ should exert itself in the interest of increased vitality. Only when the proper physiological requirements for the circulation are present, does the heart respond to autonomic stimulation.

7. Local Vagotonia

In describing the syndrome of general vagotonia, we observed that an increase of tone could also occur in isolated branches of the autonomic system. This observation may not be in accord with what we have said up to now about localized vagotonia, but the fact remains that in the absence of local causes for the condition, a general state must be assumed of such a nature as to cause an increased tone in but one part of the autonomic system. Furthermore this state may exist even if there be no observable signs of disease or of increased irritation. Pharmacology has taught us that the various vagotropic substances have varying affinities, i. e., they affect different parts of the autonomic system with varying intensity [atropin for example]. So also, we believe, do metabolic poisons act, some causing an increase in tone in this part of the autonomic, some in that. It is in this sense only that we have postulated a local vagotonia.

It is to us a matter of no small interest, that on the basis of clinical observations, we have been able to find spastic states, affecting isolated parts of the autonomic, which may justly be called of true autonomic origin, and which seem to be associated with similar states in the particular branch affected.

Periscope

Brain

(Vol. 36, Part 2)

1. Experimental and Pathologico-Anatomical Researches on the Corpus Callosum. C. T. VAN VALKENBURG.
2. Sensory Changes in Friedreich's Disease. P. W. SAUNDERS.
3. The Wassermann Reaction and Its Application to Neurology. PAUL FILDES and JAMES MCINTOSH.
4. On the Bulbar Nuclei, with Special Reference to the Existence of a Salivary Center in Man. ANTHONY FEILING.

1. *Researches on the Corpus Callosum.*—On separating the two forebrain hemispheres of any mammal, the corpus callosum becomes visible; its position between the two halves of the brain at once suggests that it serves as a connecting link between the hemispheres. There is no doubt that certain bundles exist in this mass of fibers, the orgin and termination of which lie on the same side of the middle line. These are the fibers which belong, in the wide sense of the term, to the olfactory system, *i. e.,* the fornix longus, tænia tecta, and the nervi Lancisii. These, however, the author says, do not come within the province of his research, which is confined to what is commonly understood as the corpus callosum, that is to say, the chief hemispherical commissure of the neopallia. The term commissure may be understood to mean a connection of corresponding regions of the opposite hemispheres; or, taking it in a broader sense, a connection in general of the one half of the brain with the other, through which both homotopical and heterotopical cortical regions are associated with each other. To give the word its full meaning it connotes an interhemispherical association system. Both interpretations are found in the literature, though it is not possible to state that they always rest upon conclusive anatomical or pathological evidence. The more modern writers embrace the latter opinion on the whole, chiefly on the strength of Cajal's histological investigations; in small mammals, as the mouse, with the aid of his silver methods, Cajal found that cortical axones arise, which either directly or as collaterals of projection and longer association neurons, pass to homo- and heterotopical points of the opposite hemisphere through the corpus callosum.

The author, however, states his conclusion that the ending of the callosal fibers cannot be positively proved from normal silver preparations. Moreover, were normal histological investigations sufficient to place Cajal's theory beyond all question, they afford very little evidence of the "associative" nature of the commissure. Cajal believes that the callosal fibers give off collaterals before ending, but these can be followed with certainty over very insignificant distances only in one section. Though strictly speaking the term association may be applicable to such a connection, it approaches more nearly to what one may consider as a commissure. In any case it is evident that Cajal's theories, although they may be perfectly correct, by no means justify the frequent assumption that heterotopical

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cortex regions of both hemispheres stand in connection by callosal fibers with each other.

The author believes he is justified in stating that in the posterior central convolution (1) The relation of the origin and termination of the callosal fibers is not definitely local. (2) The ending of these fibers is relatively diffuse. (3) Fibers end here which come from the contra-lateral gyrus centralis anterior, and to some extent at least the origin and termination both in front and behind the sulcus centralis are situated in the same horizontal level.

On the other hand, the anterior central convolutions are:

(1) Connected homotopically, in the sense that the origin of cortico-fugal fibers is more or less surrounded by a radiation of fibers from the homologous spot on the opposite side; it is doubtful if there exists a heterotopical connection between the gyri centrales anteriores; the author has no argument in favor of it.

(2) They are connected with the contra-lateral gyrus centralis posterior. The fibers which form this heterotopical connection are apparently far more numerous.

Commenting on clinical pathology, the author says that it is remarkable that of all the symptoms described in cases of callosal lesions very few may be ascribed, with any degree of certainty, to destruction of the commissural connections. Perfectly isolated callosal lesions rarely, if ever, occur, and the total absence of this great commissure does not necessarily cause any typical symptom. The symptomatology is very variable. Practically only those cases come under consideration where either an isolated, or more or less local, callosal softening existed, or in which by a softening in one hemisphere, a function is disturbed, which is not under the control of that hemsiphere alone. Such disturbance, when remote influence by a tumor, etc., may be excluded, can only be explained through the commissural fibers.

The author believes that in the first place his investigation offers an anatomical explanation of the well-known fact that in cases of cortical epilepsy the excitation of a motor center in the affected hemisphere can cross through the corpus callosum to the homologous center in the healthy hemisphere. If the progression of the convulsions from the one side to the other is not accurately homotopical, as is indeed often the case, it may be assumed that the excitation of the center first affected was so strong that the irritation spread directly from here to the homologous region of the opposite hemisphere.

Indirect apraxia (apraxia callosa) of the left extremities which Liepmann has described, is assumed to be due to a lesion of the commissural connection between the left and right sensori-motor centers. This view, put forward by Liepmann, is closely connected with his statement that the left sensori-motor centers have a primary rôle in evoking more complicated actions in general; even the movements necessary for given action of the left limb are innervated from the right hemisphere. The result, the author says, of his anatomical investigations, that there exists a connection between the gyrus centralis anterior and the two contralateral central convolutions, may assist in the explanation of the fact that this direct apraxia itself can be considered as a "cortical" disturbance ("gliedkinetische, innervatorische Apraxie"). The movements of the left arm then are not disturbed in consequence of a deficient formulation of the "psychic plan," nor by the ineffective transmission of the "plan" to the region, whence the execution takes place finally, but by the inadequate execution of the

action itself, as this depends on the adequacy of the immediately preceding intra-cortical activity; but this must not be confused with the regulating impulses from the immediate proximity, the disturbance of which produces cortical ataxia. In the reported case in which only two handed movements were disturbed, it was because not only did these need the coöperation of the apraxic right hand, but the functions of the left hand were primarily affected. All remaining actions of the left hand, as far as they could be examined in the aphasic patient, were quite normal.

In addition to the complete apraxia, there was a strong disinclination to make any movement of the right hand or arm. Whether this innervation was affected by the extensive centro-parietal, or by the frontal softening, as Förster and others seem to believe possible, it is certain that the initiative of the left arm and hand was not lessened by these large lesions. There can be, in any case, no question of a unilateral " eupraxic center."

Finally, there is the question as to the causes of mind blindness. A lesion of the posterior part of the corpus callosum is generally considered, at least partly, responsible for this. If this assumes that it is due to the commissural connection between two primary visual fields (areæ striatæ) being disturbed, the view is untenable, as it is an anatomical fact that no such connection exists. If the chief cause of mind blindness is to be sought in a lesion of the callosal fibers, it must be of those that connect other parts of the two occipital lobes, and it is certain that fields 18 and 19 (Brodmann) receive and give rise to parastrial radiations. These regions of the cortex comprise the " visuo-psychic area " of the English authors. It is certain that these fields coöperate with the area striata in the higher visual functions. They are, moreover, phylogenetically more recent than field 17, and increase relatively in the higher mammals. Parallel with this the occipital callosal fibers become more abundant. The exactness of the hypothesis of Niessl v. Mayendorf, that in visual function the left hemisphere predominates over the right, and localized softenings of the pole and ventral part of the occipital lobe (" left macula center ") may cause mind blindness, can be determined only by fuller clinical and anatomical investigations. One will then have to reckon with the fact that the area striata has no commissural connections.

2. *Sensory Changes in Friedreich's Disease.*—The sensory changes, says this author, have been studied by several observers. Noica, in two cases of the disease that he examined carefully, found very considerable loss to different forms of sensibility. Egger, in his investigations of " osseous sensibility," considered that this is regularly affected in Friedreich's disease. Other investigators have from time to time reported cases in which a certain amount of sensory loss was present, and cases indeed with some sensory loss have been mentioned incidentally from the time of the early differentiation of the disease from tabes dorsalis, and its occurrence is referred to in most neurological text-books.

The classical description of the disease, however, while admitting that loss to some or all forms of sensations may occur, regards it as altogether an unusual and exceptional feature, notwithstanding the fact that one of the great sensory plants of the cord is the chief site of the pathological changes that are present in the disease. A series of systematic observations, therefore, on a considerable number of cases of Friedreich's disease would seem justified, in order to see how far the classical description of the disease holds in the light of our present knowledge concerning the different forms of sensibility.

The author's chief aim in undertaking his work was the important

question of sensory conduction in the cord, as the more recent work of
Petrén, Rothmann, Head and his collaborators, and other investigators
make it probable that impulses underlying the sense of position and appre-
ciation of passive movement, the recognition of two compass points simul-
taneously applied to the surface of the body, the appreciation of vibration,
and the recognition of size, shape, form and weight, and possibly of rough-
ness and texture, are conveyed through the dorsal columns, tracts of which
there is systematic degeneration in Friedreich's disease.

Most investigators now agree with the view that the dorsal columns fur-
nish the principal pathway in the cord for the conduction of impulses that
subserve muscle sense, meaning by that term chiefly the sense of position in
space and the recognition of passive movement. Petrén concludes from
his examination of cases of stab wounds involving the spinal cord that
these impulses pass up the cord uncrossed in the dorsal columns and in
the dorsal spino-cerebellar tracts, but the view of Head and Thompson,
based on their investigation of the grouping of sensory elements in Brown-
Séquard lesions, that the dorsal columns subserve the conduction of the
impulses underlying the recognition of position and movement that pass to
consciousness, while the spino-cerebellar tract is concerned with those im-
pulses that are responsible for the unconscious maintenance of equilibrium,
seems likely to be the more correct, and Thompson has adduced later clin-
ical and pathological evidence from a case of combined degeneration to
show that the sense of position and recognition of passive movement may
be grossly affected by a lesion limited to the long fibers of the dorsal
columns.

Head and Thompson have shown also that the recognition of compass
points simultaneously applied is dissociated in the cord from tactile sensi-
bility, and passes up uncrossed in the dorsal columns, while Bing has
brought evidences that the impulses that subserve the appreciation of vi-
bration also pass up the homolateral side of the cord, and therefore must
be conducted by the dorsal columns.

The investigations of Head and Holmes on Brown-Séquard lesions,
cited in their paper go to show that not only do the knowledge of position
and passive movement, the recognition of two points, and the appreciation
of vibration depend on the integrity of the dorsal columns, but that the
recognition of size, shape, form and weight, and the appreciation of con-
sistence and texture are affected in common with these other elements of
sensibility, and the impulses which underlie them would seem, therefore,
also to be conducted by the dorsal tracts. Thompson also, in his case,
noted that the recognition of weight was grossly affected, as well as the
appreciation of position, movement and double contacts. Moreover, the
author speaks of an unpublished case of cervical Brown-Séquard lesion,
studied by Head and Holmes, which goes to confirm the view that the im-
pulses which underlie recognition of size, shape, form, weight, consistence
and texture, as well as the appreciation of position, movement, simulta-
neous contacts and vibration, are conducted through the homolateral side
of the cord.

The impulses of light touch and pressure touch are, according to most
of these observers, associated together in the cord. These impulses are
conducted partly by an uncrossed path in the dorsal columns, mostly by a
crossed path in the lateral columns (Petrén), or in the ventral columns
(Rothmann). The localization of tactile sensibility is associated with
touch and is mainly the crossed pathway. All impulses of whatever kind
that are painful, all heat impulses and all cold, cross almost at once after

a relay in the dorsal horns, and pass up the cord in the opposite lateral column, though possibly some of them pass without crossing by the lateral column of the same side. Systemic degenerations of the dorsal columns are not numerous. Tabes dorsalis, it is generally recognized, is, at least predominantly, a disease of the dorsal roots. In combined degeneration the process is probably not a true system degeneration but a funicular myelitis (Nonne). In Friedreich's disease, however, we have a condition which is usually regarded as essentially a systemic degeneration of the dorsal columns, even although the pathological changes are not limited to them. The changes in the dorsal column tracts are the most constant and most pronounced features of the pathological anatomy of the disease, and are present in all cases. In the sacral and lumbar regions these tracts may be almost entirely degenerated, but higher in the cord the degeneration in the column as a whole is not so marked. In the dorsal and cervical regions. the root-entry zone seems considerably less affected than the rest of the column; and the cornu-commissural zone, the areas immediately next the grey matter of the dorsal horns, and Lissauer's tract may be scarcely at all affected. The degeneration in the other parts of the column, however, remains very severe throughout the whole cord. The long and medium fibers of the dorsal columns are therefore the ones chiefly affected, and the affection of these may be so intense that scarcely a fiber may remain visible in cross section.

In the other tracts involved in the disease, the pyramidal and the spino-cerebellar, the degenerative changes are rarely so great as in the dorsal columns. The affection of the pyramidal tracts is most intense in the sacral and lumbar regions and diminishes as we pass up the cord, though in some cases it may be traced as far as the pons or the lower part of the crus. The degeneration in the spino-cerebellar tracts, on the other hand, increases in extent and degree, from below upwards and becomes most pronounced in the higher cervical segments.

As contrasted with the great affection of the fibers in these different tracts, and especially in the dorsal columns, the changes in the cells are not so frequent or so pronounced except, perhaps, in Clarke's column. In some cases the spinal ganglion-cells are slightly atrophied and the dorsal spinal roots, and even the peripheral nerves may be involved. There is, however, no reason to consider that the affection of the dorsal columns is secondary to a primary degeneration of the ganglion-cells or of the roots, for the changes in the roots are not nearly so definite, so frequent, or so intense as in the dorsal columns, and the affecton of the ganglion cells is slight and inconstant.

The widespread nature of the pathological changes in this disease and its variable incidence on different systems of fibers in the cord are in harmony with the view that it is a true systemic degeneration of the long spinal tracts, and especially of the dorsal column system. But even if the degeneration in the dorsal columns be regarded, not as a primary systemic one, but as due to an elective or chance degeneration in the dorsal roots, the existence of profound changes in these columns is by far the most outstanding feature of the pathology, and we should expect, therefore, to find in Friedreich's disease those forms of sensibility disturbed which have been assigned to the dorsal columns, and disturbed in proportion to the intensity of the dorsal column affection.

For the purpose of investigating this, the author examined twenty cases of Friedreich's disease, and found that all the patients examined presented the usual signs of Friedreich's disease, the skeletal deformities, the

absent deep reflexes, the extensor plantar responses, the nystagmus and the ataxia so characteristic of the disease.

The methods which he used were mainly those employed by Head and Holmes in their work on sensory changes in cerebral lesions in as far as these were applicable. They had to be modified somewhat, because the symptoms in Friedreich's disease being bilateral, there was no sound side which could be used as a standard of comparison to estimate the amount of loss present as in Head and Holmes's work, where the disturbance was unilateral.

He concludes that, in this disorder, the appreciation of touch, pain and temperature are very irregularly affected in the upper extremities, never more than very slightly and often not at all. When loss occurs it is almost always a slight distal blunting to touch, and very rarely to pin prick, or to heat and cold as well. In the lower extremities these cutaneous elements are more frequently involved, and there is often some distal hypoesthesia to light touch or even to pressure touch, and in many cases also to pin prick and to heat and cold. It is the other elements of sensation, however, chiefly those that are commonly included in the term "deep sensibility," but also the appreciation of simultaneous contacts, and of size, shape, and form, that are most severely affected. The sense of position and the recognition of passive movement, the appreciation of double contacts and of vibration are almost always more or less affected, especially in the distal parts of the lower limbs, and not infrequently, though to a less degree, in the upper limbs as well. The frequency and the constancy with which these three elements of sensation are disturbed are indeed characteristic of the disease.

The recognition of shape and form, and the appreciation of size and weight are also affected, but much less frequently and less seriously than the sense of position, the appreciation of compass points, or of vibration. This is probably due to the fact that these forms of sensibility can be examined in the upper extremities only where the sensory loss as a whole in the early stages of the disease is usually not great, and possibly also to the fact that they are more elaborate forms of sensibility. They would seem, however, to be associated in their disturbance rather with the loss of the sense of position, the appreciation of double contacts and of vibration than with tactile loss. The recognition of shape, and that of size and of weight are affected with the same frequency, and usually in the same patients, while the recognition of form is less often disturbed.

The elements of sensibility, therefore, which it is assumed are conducted through the dorsal columns of the cord, would seem to be disturbed in Friedreich's disease more or less constantly and characteristically. The loss, especially in the early stages of the disease, falls most heavily on the lower extremities, that is on the regions innervated by the spinal segments that are earliest affected, and tends to spread higher and higher over the body and to become more profound as the disease advances.

Those elements of sensibility that are conducted through the dorsal columns have been divided into two groups. The recognition of two points of the compass, and the appreciation of size, shape and form which are dependent at the periphery on the integrity of the cutaneous nerve-endings would seem to run in one group, and the sense of position and of movement, the recognition of vibration and the appreciation of weight, which are dependent peripherally on nerve endings in joints, tendons and muscles, apparently compose another group. As the disturbance of the sense of position, of double contacts and of vibration was always so great

in every case in which the recognition of size, shape, form and weight was affected he found it impossible to correlate the disturbance in recognition of size, shape, and form with that in the recognition of compass points particularly; of the loss in the appreciation of weight with that of position. In the description of the fate of these elements of peripheral sensibility, therefore, he preferred for convenience to follow the order in which they were tested clinically, and to consider together the disturbance of the sense of position and of movement, the loss of appreciation of double contacts and the diminished recognition of vibration which constitute a more primary group; the recognition of size, form, shape and weight, would seem to compose a group of most secondary and elaborate sensations.

In a disease such as Friedreich's ataxia where there is a very slow progressive degeneration of the dorsal column of the cord, it is inevitable that though the sensory loss may conform to a definite type there must be much variability in the relative intensity of the affection of the different elements of sensibility in different cases. The frequency, however, with with a characteristic sensory loss does occur would seem to justify its inclusion in the clinical picture of the disease as an integral, not as an exceptional, feature; and further, the constancy and regularity with which this loss involves the sensory impulses assigned to the dorsal columns of the cord goes to confirm the conclusions regarding sensory conduction in the cord that have been obtained by the clinical and anatomical study of local spinal lesions.

3. *Wassermann Reaction in Neurology.*—The authors' intentions in writing this paper were to review the present state of knowledge of the Wassermann reaction in all particulars which bear directly or indirectly upon neurology, but in these particulars only. They have also described fully the methods utilized by them as being the most satisfactory according to their deductions. These deductions are based upon researches into the subject of syphilis generally, and also upon the results of a long collaboration with Head and Fearnsides upon syphilis of the nervous system in particular.

The work is treated largely from a technical point of view, and thus assumes a general knowledge of the principles, and even of the technique, of the reaction on the part of the reader. The theory of the subject is not discussed, since that has no applicaton to neurology, neither have the modified tests been reviewed.

The paper is intended to be read in conjunction with works published or forthcoming by Drs. Head and Fearnsides and the authors themselves, and consequently constant references are made by means of index numbers, which remain the same throughout all these papers.

The conclusions drawn as a result of this extensive study are as follows:

1. In general diagnostic work, exclusive of nervous conditions, a positive reaction is so constant in active syphilis that such a diagnosis, made in the face of a negative result, will require very special support on other grounds before it can be considered probable.

2. A positive reaction in the cerebrospinal fluid indicates a syphilitic lesion of the central nervous system.

3. In active, untreated cases of dementia paralytica, tabes dorsalis, and cerebrospinal syphilis, the reaction is positive both in the serum and cerebrospinal fluid. In cerebral syphilis, without involvement of the spinal cord, the cerebrospinal fluid is usually negative. Except in the latter cases the strength of the reaction has no certain diagnostic value.

4. The reaction is apt to be negative in the serum or cerebrospinal fluid in cases of hemiplegia, non-progressive tabes dorsalis, and old lesions of the nervous system, especially in cases of stationary congenital syphilis. It is also usually negative in the serum particularly in very recent nerve lesions of the late secondary period, and in the cerebrospinal fluid particularly in treated cerebrospinal cases.

5. The occurrence of a positive reaction in one of the test-fluids when the other is negative is so common that a reaction found negative in one fluid only is insufficient to exclude syphilis.

6. Pure " parasyphilitic " lesions do not respond satisfactorily to treatment as shown by the slight effect upon the reaction in the cerebrospinal fluid. Cerebrospinal lesions react very readily to treatment. The celerity with which the reaction in the cerebrospinal fluid responds to treatment is an index of the " parasyphilitic " or " syphilitic " nature of the case.

7. The positive reaction in the serum is rapidly made negative by treatment in acute syphilis; but in chronic syphilis this effect is produced very slowly. In the cerebrospinal fluid, on the other hand, the rate of reduction of the reaction does not depend upon the duration of the infection. Thus, in gummatous lesions of the central nervous system, as also in secondary cerebrospinal syphilis, the effect of treatment upon the reaction in the cerebrospinal fluid is rapid.

8. The " provocative " injection of salvarsan for the purpose of exciting an exacerbation of the reaction has some, but probaby an exaggerated diagnostic value.

4. *Bulbar Nuclei.*—Anatomical observations in man and experimental investigations in the lower animals have provided us with an extensive knowledge of the position and relations of the nuclei of the cranial nerves in the medulla oblongata. The author of the paper, which is based upon a case which afforded unusual facilities for investigation, does not claim to do more than confirm our previous knowledge of these nuclei. He does attempt, however, to go further and establish the existence of a salivary center in the medull oblongata.

The patient, a miner, received a severe injury on the upper part of the neck on April 18, 1913. When a careful examination was made a few days later, the following conditions were observed: (1) Paralysis of the left side of the tongue. (2) Paralysis of the left sterno-mastoid and upper part of the left trapezius. (3) Loss of taste in the whole of the back of the tongue, more marked, however, on the left side. (4) Paralysis of the left side of the palate. No anesthesia of the palate could be detected. (5) Aphonic speech. By laryngoscopic examination the left vocal cord was seen to immobile. Loss of power of swallowing, even for liquids. In addition to the above symptoms, a slight left facial paralysis was observed on the first day after the accident, but this rapidly disappeared. It is also stated that immediately after the accident some question arose as to whether the phrenic nerve was injured or not, but on the following day no paralysis of the diaphragm could be detected. At no time was there any paralysis of the extremities, nor with the exception of the paralysis of the left sterno-mastoid and trapezius muscles was there any limitation of the movements of the neck.

The author gives a full account of the autopsy findings and results of the microscopical investigations, and summarizes the anatomical changes as follows: (1) Degeneration in the cells of origin of the spinal accessory nerve in the ventro-lateral part of the grey matter of the upper cervical region of the spinal cord. (2) Degeneration throughout the whole region

of the nucleus ambiguus. (3) Partial degeneration of the dorsal nucleus of the vagus. (4) Partial degeneration of the hypoglossal nucleus. (5) Marked fatty changes in the solitary bundle. (6) Scattered degenerated cells in the grey matter of the upper part of the medulla just dorsal to the inferior olive.

There was only a small amount of fatty change present, it being practically confined to the solitary bundle. The length of time which elapsed between the injury and the death of the patient (over two months) is no doubt in part a reason for the limited amount of fatty changes present. Since the dorsal nucleus of the vagus, which is largely a sensory nucleus, showed ony partial degeneration, it may be surmised that perhaps the injury to the nerve took place on the distal side of the ganglion, the degenerated cells representing the motor part of this nucleus. In this case, the fatty change in the solitary bundle would represent degenerated fibers from the glosso-pharyngeal nerve. It was, however, impossible to say at exactly what point in their course through the jugular foramen the nerves were injured. From the fact too that the hypoglossal nucleus showed only partial degeneration, we may assume that the injury to the nerve was not complete, a hypothesis borne out by an examination of the skull, for it was found that the fracture did not directly involve the anterior condyloid foramen.

JELLIFFE.

MISCELLANY

A STUDY OF THE METABOLISM OF CALCIUM, MAGNESIUM, SULPHUR, PHOSPHORUS, AND NITROGEN IN ACROMEGALY. Olah Bergeim, F. T. Stewart, P. B. Hawk. (The Journal of Experimental Medicine, Vol. XX, No. 3.)

The mechanisms underlying the metabolism of the mineral constituents of the human body are almost unknown. The present study is a tentative approach to certain aspects of the problems involved. The authors find that in acromegaly a distinct retention of calcium, magnesium and phosphorus was noted, which was not accompanied by corresponding changes in general metabolism, as evidenced by a practical balance of nitrogen and sulphur. It is concluded that there is a primary disturbance in the metabolism of the mineral elements mentioned, with the probable formation of new bony tissue. The distribution of elements between urine and feces shows no abnormal variations. A suggestion is made as to the reasons for variable calcium output in the urine on a uniform diet.

JELLIFFE.

LIVER FUNCTION AS INFLUENCED BY DUCTLESS GLANDS. G. H. Whipple and W. P. Christman. (Jour. of Exp. Medicine, Vol. 20, No. 3, p. 297.)

Physico-chemical metabolism mechanisms are slowly being analyzed with the result that vegetative neurology is opening up as a specialty almost of its own as a fundamental stratum of neurological knowledge. The relation of liver function to certain vegetative neurological structures is here discussed.

The authors find that when phenoltetrachlorphthalein is injected intravenously, it is eliminated from the body in the bile through the activity of the hepatic epithelium. The feces may be collected after purgation and the phthalein extracted and estimated against a standard solution. The

estimation of phthalein can be done with accuracy in a suitable colorimeter and the elimination in normal dogs is quite constant. Given a definite liver injury by means of poisons (chloroform, phosphorus), the amount of phthalein excreted will be diminished and the fall in output will be proportional to the amount of injury. With an acute fatal poisoning the curve may fall to zero. Under certain conditions of vascular interference the liver phthalein may show a decreased output; in passive congestion of the liver and with the Eck fistula the liver output may fall considerably below normal. Known disturbances of the liver function due to parenchymatous injury or vascular disturbances are indicated by a fall in the phthalein excretion curve. Conversely it may be claimed that a drop in phthalein excretion may indicate a decrease in the functional capacity of the liver even if there be no detectable histological changes. Adrenal insufficiency produced by extirpation of three fourths or more of the gland tissue will be associated with a drop in liver phthalein excretion. With hypertrophy of the adrenal fragment the excretion comes back to normal, but may fall again when more adrenal tissue is removed. Pancreatic insufficiency causes a progressive fall in the phthalein excretion indicating a grave lowering of the functional capacity of the liver. This fact has a direct bearing on the question of diabetes. Parathyroid insufficiency with tetany causes no decrease in phthalein output, but at times a rise above normal. This comes out best when the phthalein curve is low following pancreas extirpation. Parathyroid tetany may cause hyperactivity on the part of the liver cells. Thyroid insufficiency produces no change in the uniform curve of phthalein excretion. Hypophysis insufficiency shows an initial fall in the curve, followed by a return to normal and a final drop in the last few days before death. These experiments supply evidence to the effect that the liver is very much concerned in the derangement that follows the removal of the ductless glands. Hence it seems probable that this disturbance of the liver function may be an important factor in the general symptom complex of ductless gland insufficiency.

JELLIFFE.

THE MID BRAIN RESPIRATORY TRACT. Graham Brown (Journal of Physiology, 48, 1914, p. 32).

The author says that it has for some time been suggested by Marckwald and others that there exists in the brain of the higher animals a center which in some way regulates respiration. The exact location of such a center has not as yet been forthcoming, but it was supposed to be probably in the formatio reticularis at the level of the posterior colliculi. Dr. Brown records an observation which goes strongly to prove the presence of such a respiratory controlling area. The animal used was one of the monkeys. The brain was exposed and divided in the region of the thalamus. On a certain area, to be presently noted, rapid faradic stimulation by the unipolar method resulted in immediate gasping of the animal. There was also rapid panting, and the abdominal muscles contracted and relaxed strongly and rhythmically each second. That these effects were due to the particular site and character of stimulation was shown by the fact that withdrawal of the stimulation caused immediate cessation of the movements. There was also no after-discharge. The area, too, was very limited, and stimulation 1.5 millimeters away from it showed no effect. The site of this "respiratory" area was 3 mm. from the aqueduct, just to the side of it, at a point on the efferent tract (recto-bulbar?) of the

anterior corpora quadrigemina. This is an isolated observation, but if confirmation is forthcoming it will add still another nervous center to those already located as responsible for certain coördinated and automatic actions.

PARAMENINGOCOCCUS AND ITS ANTISERUM. Martha Wollstein. (Journal of Experimental Medicine, Vol. XX, No. 3.)

Cases of epidemic meningitis which do not react to serum are often due to a different organism, the parameningococci of Dopter. Wollstein has studied this problem with the following results.

The parameningococci of Dopter are culturally indistinguishable from true or normal meningococci, but serologically they exhibit differences as regards agglutination, opsonization, and complement deviation. Because of the variations and irregularities of serum reactions existing among otherwise normal strains of meningococci it does not seem either possible or desirable to separate the parameningococci into a strictly definite class. It appears desirable to consider them as constituting a special strain among the meningococci not, however, wholly consistent in itself. The distinction in serum reactions between normal and parameningococci are supported by the differences in protective effects of the monovalent immune sera upon infection in guinea pigs and monkeys.

It is therefore concluded that it is highly desirable to employ strains of parameningococcus in the preparation of the usual polyvalent antimeningococcic serum. It remains to be determined whether it is better to employ the parameningococci along with the normal meningococci in immunizing horses, or to employ normal and para strains separately in the immunization process and to combine afterwards, in certain proportions, the sera from the two kinds of immunized horses.

JELLIFFE.

LOCALIZATION OF THE VIRUS AND PATHOGENESIS OF EPIDEMIC POLIOMYELITIS. Simon Flexner and Harold Amoss. (Journal of Experimental Medicine, Vol. XX, No. 3.)

These authors find after considerabe experimentation that the virus of poliomyelitis is capable of penetrating the retina without producing apparent injury, to reach the central nervous organs. The virus injected into the blood is deposited promptly in the spleen and bone marrow, but not in the kidneys, spinal cord or brain. Notwithstanding the affinity which the nervous tissues possess for the virus, it is not removed from the blood by the spinal cord and brain until the choroid plexus and the bloodvessels have suffered injury. The intervertebral ganglia remove the virus from the blood earlier than do the spinal cord and brain. An aseptic inflammation produced by an intraspinous injection of horse serum facilitates and insures the passage of the virus to the central nervous organs, and the production of paralysis. The unaided virus, even when present in large amounts, passes inconstantly from the blood to the substance of the spinal cord and brain. When the virus within the blood fails to gain access to the central nervous organs, and to set up paralysis, it is destroyed by the body, in the course of which destruction it undergoes, as a result of the action of the spleen, and perhaps other organs, diminution of virulence. The histological lesions that follow the intravenous injections of the virus in some but not in all cases differ from those which result from intraneural modes of infection. In escaping from the blood into the spinal cord and brain, the

virus causes a lymphatic invasion of the choroid plexus and widespread
perivascular infiltration, and from the latter cellular invasions enter the
nervous tissues. A similar lymphoid infiltration of the chloroid plexus may
arise also from an intracerebral injection of the virus. The histological
lesions present in the central nervous organs in human cases of poliomye-
litis correspond to those that arise from the intraneural method of infection
in the monkey. The virus in transit from the blood through the cerebro-
spinal fluid to the substance of the spinal cord and brain is capable of being
neutralized by intraspinous injection of immune serum whereby the pro-
duction of paralysis is averted. Carmin in a sterile and finely divided state
introduced into the meninges and ventricles sets up an aseptic inflammation,
but is quickly taken up by cells, including ependymal cells. When an
aseptic inflammation has been previously established by means of horse
serum, or when the nervous tissues are already injured by the poliomyelitic
virus, the pigment appears to enter the ependymal cells more freely. The
experiments described support the view that infection in epidemic polio-
myelitis in man is local and neural, and by way of the lymphatics, and not
general and by way of the blood. Hence they uphold the belief that the
entrance of the infection is the upper respiratory mucous membrane.

<div style="text-align: right">JELLIFFE.</div>

FURTHER STUDIES ON THE DEVELOPMENT OF THE CRANIAL SYMPATHETIC
GANGLIA. Albert Kuntz. (The Journal of Comparative Neurology,
Vol. 24, No. 3.)

Following an extended investigation of the development of the sym-
pathetic nervous system in the vertebrate series, in which the sympathetic
ganglia in the cranial region were not specifically considered, the writer has
undertaken an investigation of the development of the cranial sympathetic
ganglia in types of the several classes of vertebrates. Observations on the
development of these ganglia in embryos of the pig have been published in
an earlier paper by the same author. The present paper embodies the results
of a comparative study of the development of the cranial portion of the sym-
pathetic nervous system in embryos of the common toad fish (*Opsanus tau*),
the frog and *Ambystoma*, the turtle, the chick, and the pig. In the general
investigation of the development of the sympathetic nervous system, with
which are associated the names of not a few able investigators, the cranial
portion of that system has been quite generally neglected. Observations
on the development of the ciliary ganglion in types of the several classes
of vertebrates have been recorded by not a few investigators, many of
whom studied the development of this ganglion in connection with their
investigations of the development of the eye-muscle nerves. Recorded ob-
servations on the development of the remaining sympathetic ganglia in the
cranial region, in the lower vertebrates, are fragmentary and incomplete.

The author has not attempted a systematic review of the literature
bearing on the development of the cranial portion of the sympathetic nerv-
ous system. For a more or less complete review of the literature on the
development of the ciliary ganglion in types of the several classes of verte-
brates he refers to Carpenter's paper on " The Development of the Oculo-
motor Nerve, the Ciliary Ganglion, and the Abducens Nerve in the Chick."

In his discussion and conclusions he states that according to his observa-
tions the cranial sympathetic ganglia bear the same genetic relationships to
the cerebrospinal nervous system, in all the classes of vertebrates, as do

the ganglia of the other parts of the sympathetic nervous system, *i. e.*, they arise from cells which have their origin in the cerebrospinal ganglia and the wall of the neural tube and advance peripherally along sensory and motor nerve roots respectively. Not all the nervous elements taking part in the development of the sympathetic ganglia actually migrate as such from the cerebrospinal ganglia or the neural tube; many of them arise from the mitotic division of cells which have advanced peripherally from the cerebrospinal nervous system. The character and destiny of the cells which become separated from the cerebrospinal nervous system and advance peripherally along the cranial and spinal nerves have been discussed in earlier papers by the author and are not, therefore, considered in the subject of this abstract. The majority of these elements are cells of the " indifferent " type, many of which retain the capacity for cell division after they have become separated from the cerebrospinal ganglia or the neural tube. Consequently, mitotic figures may be frequently observed along the paths of migration and in the peripheral ganglia. Such mitotic division of nervous elements in the paths of peripheral nerves and the primordia of peripheral ganglia probably occurs less frequently in embryos of the lower than in embryos of the higher vertebrates. Neither do all the elements arising in this manner take part in the development of the sympathetic ganglia. Many of them obviously become differentiated into cells of the neurilemma.

The distribution and the relative degree of development of the cranial sympathetic ganglia vary greatly in the several classes of vertebrates. The degree of development of the several cranial sympathetic ganglia is obviously correlated with the demands of the functions of the structures innervated by the sympathetic nerves associated with them.

The author sums up as follows: (1) The sympathetic ganglia on the cranial portion of the nerve trunks arise, in embryos of the toad fish, primarily from cells derived directly from the first spinal ganglion and the cerebral ganglia associated with the X, VII and V cranial nerves. Certain of these ganglia receive cells also which advance peripherally from the neural tube along motor nerve-roots. The ciliary ganglion arises in the path of the oculomotor nerve primarily from cells which advance peripherally from the mesencephalon along this nerve. It later receives a relatively small number of cells which advance peripherally from the Gasserian ganglion and the first sympathetic ganglion associated with the latter along the radix ciliaris longa. (2) A permanent ciliary ganglion is probably not developed in *Amblystoma*. In larvæ of the frog, the ciliary ganglion arises in essentially the same manner as in embryos of the fish. Other distinct cranial sympathetic ganglia probably do not occur in the Amphibia. (3) In embryos of the turtle, the ciliary ganglion arises in the path of the oculomotor nerve primarily from cells which advance peripherally from the mesencephalon along this nerve. After this ganglion has become connected with the ophthalmic nerve it receives a relatively small number of cells which advance peripherally from the Gasserian ganglion. The sphenopalatine ganglion arises, in embryos of the turtle, in the paths of the great superficial petrosal nerve and soon becomes connected by fibrous rami with the maxillary nerve. It arises from cells which advance peripherally from the geniculate and the Gasserian ganglia respectively along the great superficial petrosal and maxillary nerves. Ganglia homologous with the otic and the submaxillary ganglia of the higher vertebrates were not observed

in embryos of the turtle.   (4) In embryos of the chick, the ciliary ganglion
bears the same genetic relationships to the oculomotor and the ophthalmic
nerves and arises in essentially the same manner as in embryos of the turtle.
The otic ganglion arises, in embryos of the chick, in the path of a tract of
sympathetic fibers which emerge from the sympathetic plexus surrounding
the carotid artery, primarily from cells which are derived from the superior
cervical and the geniculate ganglia.   The sphenopalatine ganglion arises, in
embryos of the chick, primarily from cells which advance peripherally from
the geniculate ganglion along the great superficial petrosal nerve, but prob-
ably receives cells also which advance peripherally from the Gasserian gang-
lion along the maxillary nerve. The relatively small submaxillary ganglion
is genetically related to the mandibular nerve.   (5). In embryos of the pig,
the ciliary ganglion is genetically related to the oculomotor and the ophthal-
mic nerves.   The sphenopalatine ganglion arises from cells which advance
peripherally from the Gasserian ganglion along the maxillary nerve.   The
otic and the submaxillary ganglia are genetically related to the mandibular
division of the trigeminal nerve and probably receive cells from both the
Gasserian ganglion and the wall of the rhombencephalon.

JELLIFFE.

Notes and News

The Massachusetts Society for Mental Hygiene has opened an office
at Room 313, Ford Building, 15 Ashburton Place, Boston.   The officers of
the Society are: the Honorable Harvey H. Baker, Boston, President;
Doctor Walter E. Fernald, Waverly, Vice President; Doctor Charles E.
Thompson, Gardner, Secretary; John Koren, Esquire, Boston, Treasurer;
Executive Committee: Miss Edith M. Burleigh, Boston; Doctor James J.
Putnam, Boston; Doctor Alfred E. P. Rockwell, Worcester; Doctor Henry
R. Stedman, Brookline; Professor Robert M. Yerkes, Cambridge.
Doctor Frankwood E. Williams, formerly Resident Physician at the Psycho-
pathic Hospital, Ann Arbor, Michigan, and first Assistant Physician at the
Psychopathic Hospital, Boston, has been appointed Executive Secretary.

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Original Articles

UNILATERAL HYPERTROPHY OR TROPHEDEMA OF LIMBS. REPORT OF A CASE[1]

BY HOWELL T. PERSHING, M.D.

DENVER

In June, 1913, I was consulted by Miss H., aged 19, on account of the right limbs being larger than the left. She has since remained under observation and the conditions presented are so rare that they should be recorded.

Family History.—The father is now 51 and in good health. Father's father died at 66 after a four months' illness in which " asthma " was the principal symptom, his previous health having been good. Father's mother died at 70; she was always of feeble vitality and had two operations for epithelioma of the face. All of the father's seven brothers and sisters still living are described as not very strong; two died in infancy.

The mother is now 48. She has a mitral regurgitant murmur with good compensation. In 1901, a few months after a severe fright, she began to have paroxysms of pain in the fingers with heat and redness followed by cyanosis. I treated her for this condition, regarded as Raynaud's disease in 1905. In 1907 necrosis of the terminal joint of the left thumb, succeeding a series of these attacks, required amputation. The mother's father died at 72; his health before the last illness was good. The mother's mother died at 52, probably of strangulated hernia. One of the mother's sisters is nervous; two brothers and two sisters are well.

[1] Read at the fortieth annual meeting of the American Neurological Association, May 7, 8 and 9, 1914.

The patient's older brother, now well, had migraine in child-
hood, a younger sister suffers from constant backache, a brother
aged 8 is described as not strong. No member of the family is
known to have had anything like a localized hypertrophy or
atrophy.
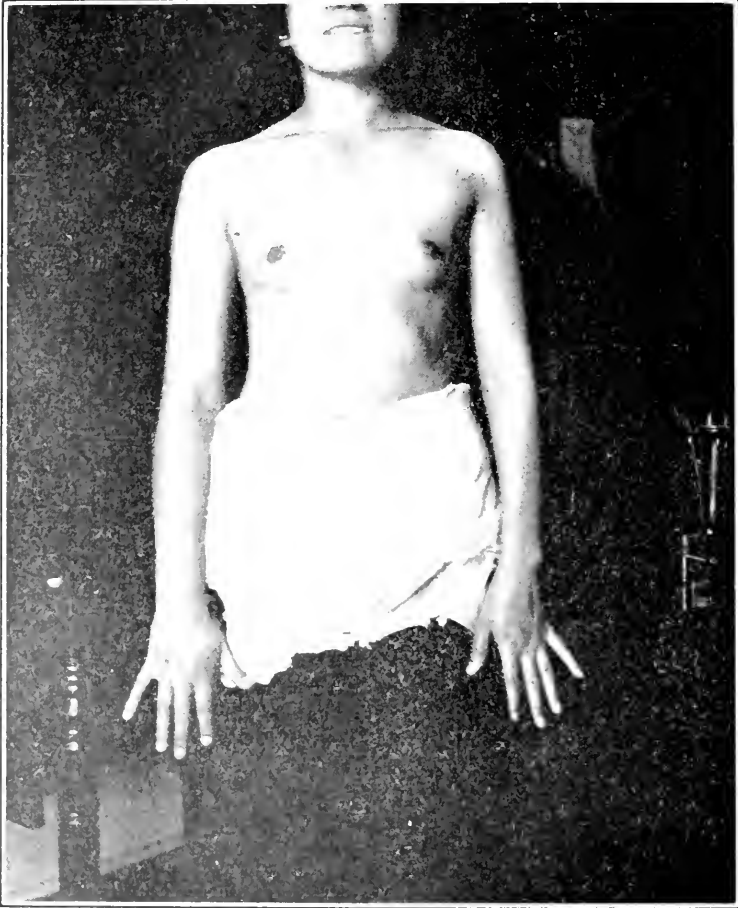
Fig. 1. Note greater thickness of arm and forearm on the right side.

The patient herself had a normal birth and developed normally
until 3 years of age when she had a severe illness supposed to be
typhoid fever.

After recovery from this, the left limbs were for the first time
noted as smaller than the right, and they were specially exercised

to bring their development up to the supposedly normal right ones. At 7 years there was an attack of scarlatina with good recovery. At 13 menstruation was established and has since been quite regular and normal. Typical attacks of migraine, which had recurred at times since childhood, became very frequent during the winter of 1911–1912 when she was working as a telephone operator.
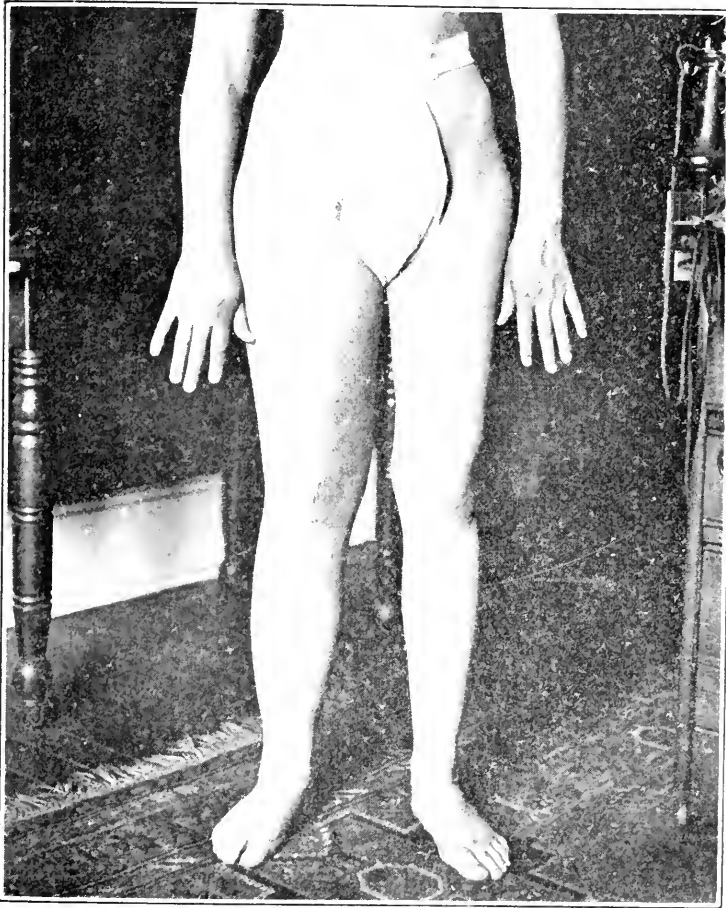
FIG. 2. Showing greater thickness of thigh and leg on right side without increase in length and with very little difference in the feet.

Once in the summer of 1913, while taking thyroids, the right index finger became blanched, suggesting the onset of Raynaud's disease, but circulation returned and the symptom has not recurred.

The difference in the size of the limbs on the two sides gradually increased from the age of 3 and the increase was especially rapid during the 14th year when menstruation was established. It then became apparent that the right limbs were abnormally large.
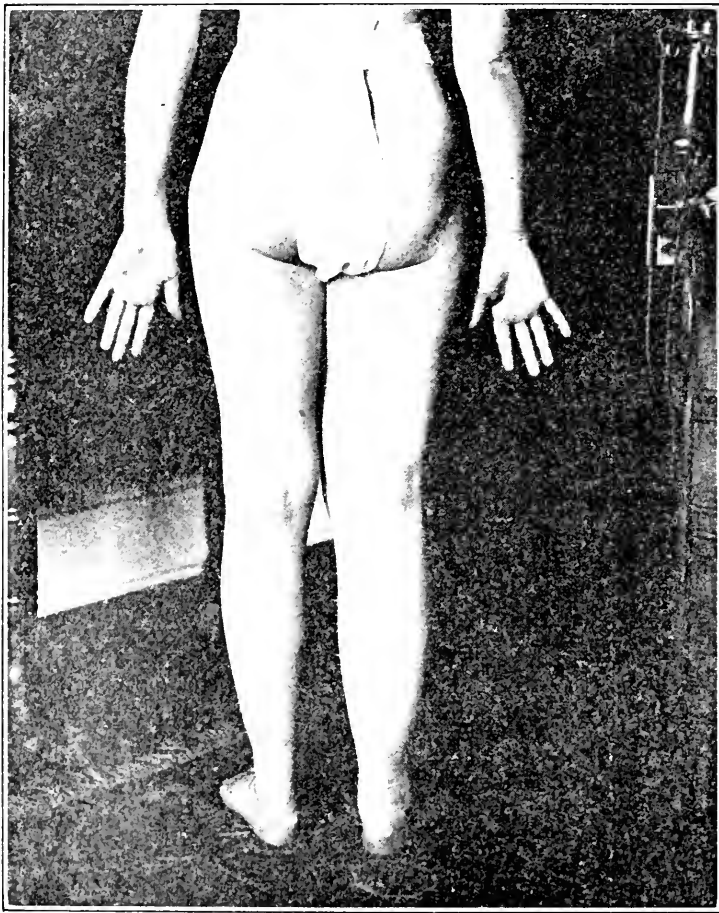
Fig. 3. Showing same relations as Fig. 2.

The hair of the head has been rather scant, harsh and dry, splitting easily, and has seemed to grow longer on the *left* side. The pubic and axillary hair has also developed rather scantily but otherwise normally. The voice has been low pitched and slightly husky; she has been unable to sing, especially the higher notes. There has been a heavy feeling in the throat and she has habit-

ually tried to clear it by little coughs. On exertion she soon tires all over. Family and school life and mental development have been entirely normal.

On examination no motor or sensory loss or change in the reflexes could be detected. Dissociation of the forms of sensation was especially looked for, but not found. The heart was normal, blood pressure 120, the same on the two sides. Hemoglobin, red cell count and differential leucocyte count normal. The skin showed no abnormality except undue moisture especially
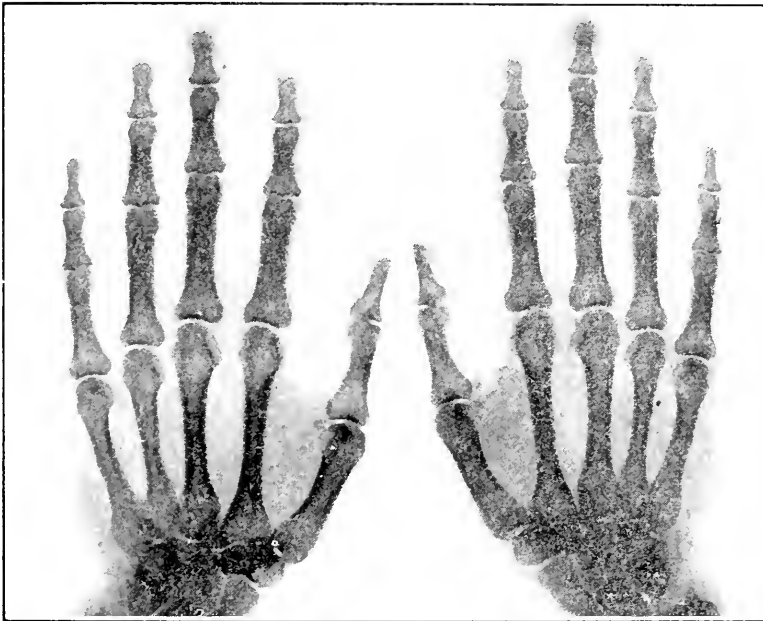
Right.   Left.
FIG. 4. The right hand is very slightly larger than the left.

of the hands and axillæ. The patient thinks perspiration is greater on the right side of the body and is sure that the right arm does not bleed as readily as the left. The urine was normal.

Inspection and palpation of the neck with especial reference to the thyroid gland detected nothing abnormal.

The difference in the bulk of the limbs on the two sides is well shown in the photographs and in the following measurements:

Circumference of	Right	Left
Thigh	54 cm.	48 cm.
Calf	39	32
Arm	25	22.5
Forearm	25	23
Hand	18.8	18.3

In length the lower limbs are equal. The right arm from
acromion to tip of middle finger is 73 cm.; the left 72.3 cm.; a
barely measurable difference.

The head, neck and chest are symmetrical. The abdomen is
nearly symmetrical, but just above the right groin and right iliac
crest the subcutaneous tissue is somewhat thicker than on the
left side. Passing upward this difference steadily diminishes and
at the margin of the ribs, the thickness on the two sides is the same.

Left.   Right.

Fig. 5. The bones and muscles are alike on the two sides, but on the right
the subcutaneous tissue is very greatly increased.

The subcutaneous tissue, estimated by picking up a fold, is
obviously much thicker in the right limbs than in the left, the
difference in this tissue alone apparently accounting for the asym-
metry. This observation is confirmed by the radiographs, which
show no difference in the size of the bones, right and left, a little
in the muscles as a whole, probably accounted for by the inter-
muscular tissue, and a very great difference in the thickness of the
subcutaneous tissue.*

* A very slight difference in the shadows of the bones is fully ac-
counted for by the bones on the right side being brought slightly nearer
to the source of the rays by the thickened soft parts.

This tissue is firm and does not pit on ordinary pressure, but prolonged pressure makes an indentation which persists for a considerable time. The indentation made by the shoe top is apparent in the photographs. There is no impairment of the general health, except a certain amount of worry and consequent depression and irritability caused by the knowledge of the deformity.

This case is clearly related to the hereditary edema of Milroy[1] although sharply contrasted with this eminently familial group in affecting only one member of the family. It corresponds exactly to a group of cases reported together as trophedema or hypertrophy by Meige,[2] Rapin,[3] Hertoghe[4] and Mabille.[5] Meige defines the condition as follows: "An edema which is chronic, pale, firm, painless, of segmentary distribution, unilateral or bilateral, isolated or familial and hereditary, sometimes perhaps also congenital."

Little can be said as to causation. In the hereditary cases both the original cause and the mechanism of inheritance are unknown. In other cases as well as in this one the onset has followed one of the infectious fevers such as typhoid, measles, smallpox or scarlet fever, but the possibility of the relation being merely one of coincidence is obvious. Rapin speaks of the disorder as myelopathic but signs of organic disease of the cord are lacking in all the cases. One naturally speculates as to functional derangement of trophic and vasomotor impulses and as to disorder of the ductless glands.

On first seeing the patient, with the mother's history in mind as suggesting a relative insufficiency of the thyroid and taking into account the character of the thickened subcutaneous tissue, the harshness of the hair and huskiness of the voice, I made a provisional diagnosis of myxedema, in spite of the apparently normal condition of the thyroid and the fact I had never heard of a unilateral myxedema. The failure of careful persistent thyroid medication to do any good, caused this diagnosis to be abandoned, but I note with interest that the French and Swiss observers made the same diagnosis of thyroid insufficiency and Hertoghe would not give it up in spite of the failure of thyroid medication.

The only treatment so far known that has any certain effect is the application of elastic bandages. This of course is only palliative but it is worth while. The fact that in my patient the right

foot is but little larger than the left, is no doubt due to the re-
straining pressure of the shoe.

This is called a case of unilateral hypertrophy because such
cases have usually been reported under the general head of
hypertrophy.

Meige's term, trophedema, is more precise, but Rapin and
Mabille, in the same number of the Nouvelle Iconographie, use
the terms hypertrophy and hemi-hypertrophy in their titles. More-
over, trophedema is really an hypertrophy if only of the connect-
ive tissue.

The clavicles in his own case were alike. True, one of the
photographs makes the inner end of the right clavicle seem en-
larged but this is a deceptive effect of shading.

1. Milroy. An Undescribed Variety of Hereditary Edema. N. Y. Med.
        Jour. 1892.
2. Meige. Sur le trophoedème. Nouvelle Iconographie de la Salpétrière,
        1901, 6.
3. Rapin. Sur une forme d'hypertrophie des membres. Ibid.
4. Hertoghe. Contribution a l'étude du trophoedème chronique. Ibid.
5. Mabille. Observation de trophoedème. Deux cas d'hemihypertrophie
        congenitale du corps. Ibid.

LOSS OF MEMORY ALLEGED BY MURDERERS

By Theodore Diller, M.D.

PITTSBURGH

In an interesting communication before the last meeting of the American Neurological Association, Dr. George Walton, basing his experience on a large number of cases of which he had knowledge, pointed out that very commonly persons accused of murder denied all memory of the actual killing, although they might remember events up to within a very short period of the act and very shortly afterwards. I believe there can be no doubt whatever that this statement is correct, and this view was borne out by testimony of those who discussed Dr. Walton's paper. Certainly this is my own experience. In examination of a considerable number of persons charged with murder, denial of actual killing was made in almost every case.

The discussion of Dr. Walton's paper chiefly turned on the question as to whether this loss of memory of the actual murder was real or feigned; it was pointed out by two or three of the speakers that we could not be perfectly certain in any given case that the amnesia was real or that it was feigned. However, as for myself, I have been disposed to regard this loss of memory as real and not feigned; and for these reasons: (1) It is unlikely that the memory of the killing would be feigned so very *generally* by persons who committed murder; (2) The fact that repeated questioning and cross-questioning, threats of all sorts have failed to shake the statement made by murderers as regards this point when generally they seem so communicative about everything else.

I have offered to myself the following reason for this loss of memory: When the murder is committed it is done at the height of great emotional disturbance; and because of the great intensity of emotion the act, the thoughts which occur at that time are not registered in the memory as the photographic film upon which an intense light is thrown fails to register a picture and only a blur

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is produced. To illustrate, I might mention it often happens that persons who are subject to violent attacks of anger retain no memory whatever of words uttered or conduct performed during such a paroxysm.

In this connection, I wish to make mention of two murder cases which came under my observation, one four years ago and one only last year. These were both cases of what I took to be paranoid dementia præcox; both persons were acquitted of murder by reason of insanity and sent to Dixmont Asylum near Pittsburgh where they have remained up to the present time. After reading the abstract of Dr. Walton's paper and the discussion thereon, I went down to Dixmont, two days ago, and by the courtesy of Dr. Hutchinson, the superintendent and Dr. Barrett the assistant physician, reexamined both these men. Both of them denied all memory of the actual murder, just as they had when I examined them in jail before the trial. I pointed out to both of them that their cases were settled and no harm could come to them by an admission of memory of the deed and tried in every possible way to ascertain that their loss of memory was shammed. But in both cases denial of the memory of the killing was complete and made in precisely the same terms as before the trial; and their manner showed no real concern for the act which they had committed and each retained the same delusions he had entertained before the murder.

So here are two cases in which events point very strongly to the conclusion that the loss of memory for the murder was real.

THE NEUROPATHOLOGICAL FINDINGS IN A CASE OF PERNICIOUS ANEMIA WITH PSYCHICAL IMPLICATION

By J. A. F. Pfeiffer, M.D.

GOVERNMENT HOSPITAL FOR THE INSANE, WASHINGTON, D. C.

Severe nervous symptoms are a frequent clinical entity in pernicious anemia, and although mentality is rarely impaired, psychical phenomena of varying intensity have been observed.

It is therefore pertinent that this fact should be appreciated, especially the occurrence of psychic derangement in the initial stages of the affection, as obviously not a few cases of this character fail to be diagnosed early in consequence of such symptoms, which tend to obscure the true nature of the disease process.

The object of this paper, however, is to consider chiefly the histopathological alterations involving the brain and spinal cord in a case of pernicious anemia with nervous and mental symptoms, since little is known regarding the cerebral lesions, and apparently but few attempts have been made to study the anatomical changes in the brain from this disease.

C. J., aged 55, was admitted to the Government Hospital for Insane, on June 15, 1911.

Family History.—Father died at the age of forty-eight from typhoid fever. He had always been a healthy man of good habits. Mother is living and enjoys health at the age of seventy-four years. The patient was the eldest child of a family consisting of one girl and two boys. At the time of writing both his sister and brother are alive and healthy. There was no history of nervous or mental diseases in the family, and no history of syphilis or tuberculosis.

Personal History.—The patient when a child was healthy and well nourished. He had whooping cough at the age of nine years, but otherwise never suffered from any serious illness at any time. He went to school at the age of six and was considered a good scholar. He continued at school for about nine years, leaving when sixteen, and began work on a farm, where he remained for several years. He was married when twenty-two years of age,

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and then immigrated to southwestern Nebraska, where he secured
a homestead claim, and after a residence there of three years, ac-
quired a clear title of ownership in the property. Subsequently
he sold his farm at a considerable profit and obtained a position in
a general store. After holding this position for several years, he
decided to become a veterinarian, and entered a veterinary college,
from which he was graduated at the end of a course extending
over a period of two years. He practiced his profession for eleven
years, and later became an inspector. He never had any venereal
disease and did not indulge in the use of alcohol or drugs.

History of Present Illness.—In February, 1911, several months
before his admittance to this hospital, the patient suffered with
fatigue and nervousness. Digestive derangements were in evi-
dence, and an indisposition to take food, associated with nausea
occurred. No symptoms referable to the nervous system were pres-
ent at this time, except persistent headache, a creepy feeling over
his entire body and paroxysmal sensations of warmth. Owing to
weakness he was compelled to remain at home, but after some
days his condition improved sufficiently for him to resume his
usual occupation. In April of the same year he was required to
move to Texas. During the first few weeks of his residence there,
he seemed fairly well, and was vaccinated against typhoid fever
without any unusual manifestations. Some weeks later, however,
he again experienced symptoms of languor, progressive weakness,
continuous headache and intestinal disorder, in consequence of
which he entered a hospital. While there he became delirious.
On admission to this hospital the patient presented a fairly well
nourished appearance, although there was evidence of some emaci-
ation. The skin was of a slight yellow tint and the mucous mem-
branes were pale. The respiratory system showed no signs of
pulmonary disease, but the cardiac impulse was feeble. There
were some vomiting and tenderness of the abdomen. The abdom-
inal organs were normal, as far as could be determined. No
sclerosis of the peripheral vessels was detectable, and the blood
pressure was normal. He was weak and although exceedingly
restless, made no attempt to arise from his bed. He frequently
moved his arms about in a rather aimless manner, and eventually
showed evidence of considerable confusion. The temperature was
slightly subnormal when admitted. On several occasions, how-
ever, it rose to 101° F., but for the most part was normal through-
out the entire course of his illness. His pulse was usually rather
feeble and varied between 75 and 90 beats per minute. Urinalysis
showed nothing abnormal, and examination of the feces was nega-
tive. A blood examination was made shortly after admission with
the following results: Red blood cells, 900,000; hemoglobin, 30
per cent.; color index, 1.6; white blood cells, 6,000; polynuclear
neutrophiles, 57 per cent.; lymphocytes, 36 per cent.; normoblasts
were encountered and several megaloblasts.

A systematic microscopical examination of the blood was instituted, and showed the characteristic feature of pernicious anemia. Normoblasts were invariably present, and sometimes occurred in considerable numbers. Megaloblasts were usually in evidence. The lymphocyte count was highest on November 30, reaching 40 per cent.; the polynuclear neutrophile count was 50 per cent. The Wassermann test with both the blood and spinal fluid was negative.

The following clinical data indicate the condition of the patient during his residence at this hospital.

A few days after his entrance some improvement was observed, but he was irrational at times and suffered with drowsiness and persistent headache. Nausea and vomiting continued. He took but little nourishment and considerable dyspnea was in evidence.

His condition gradually improved and by July 10 the nausea and vomiting had ceased and his appetite was better. His headache had disappeared and only slight dyspnea was apparent. At this time he asserted that he had no recollection of what had transpired while in the hospital. He complained of stinging and tingling sensations in his arm and legs which he stated were due to electric currents traversing his bed. Various auditory hallucinations were present. Both the deep and superficial reflexes were easily obtained.

No marked variation in his condition occurred in the following month. Paresthetic sensory disturbances continued, and he asserted that the mattress became very hot; occasionally he was allowed to be up and about, but on account of his weakness it was necessary for him to return to bed after a short interval. Delusions of a mild persecutory character were present and brief periods of forgetfulness.

On September 3, his temperature rose to 101° F. and there was pronounced physical discomfort. Considerable gastro-intestinal disorder was associated with this illness and vomiting spells occurred. He was extremely weakened. His enunciation was defective and speech was slightly thickened. The mucous membranes were anemic and the skin of a distinct lemon-yellow color. He promptly recovered from this attack, however, and subsequently showed marked improvement, notably regarding his mental status. During the month of October and early part of November no special change in his physical condition was observed, but his intellect frequently appeared quite normal and he responded well to sensory tests. Some interesting changes were discovered upon examination of the nervous system, and following is a summary of the results secured during this period.

The cranial nerves were normal. The pupils were equal and regular in outline. Reacted to both light and accommodation. By ophthalmoscopic examination the vessels appeared small and the discs pale. No defectiveness in the movements of the eyes or face was evident.

The muscles of the extremities were poorly developed, but retained their contours. No deficiency in power could be detected, but ataxia was well marked. The FN, FF and FT tests could not be performed. His gait was ataxic and Romberg's sign was present. The tendon reflexes of the upper extremities were readily demonstrated.

Tactile sensibility was not affected. He responded quickly and excessively to pin pricks, the hyperesthesia being more pronounced in the abdominal region and lower limbs. Heat and cold were differentiated without difficulty. Some disturbance in the appreciation of passive position was apparent. He was able to discriminate gross differences in weights, but failed to detect slight variations.

In the latter part of November his condition grew worse. Asthenia was marked. He was unable to go about without assistance, and owing to a tendency toward syncopal attacks he was confined to his bed. Restlessness and hallucinations were prominent. Vomiting and diarrhea were not infrequent.

A progressive failure in his physical condition occurred in spite of treatment and he died on December 29.

POSTMORTEM RECORD

External Examination.—The autopsy was performed four hours after death, and the body was in an excellent state of preservation. The body was considerably emaciated, and the skin presented a uniform lemon-yellow tint. The thyroid and lymphatic glands were not enlarged. The teeth were in good condition, but the gums were slightly inflamed, and the tongue furred. No skin eruptions, hemorrhages, edema, or scars were in evidence.

Internal Examination.—Thorax: The superficial fat was greatly decreased, and the muscles appeared dark red in color. The pericardium was unaltered, and the fluid which it contained was clear and normal in quantity. The heart weighed 50 grams. It was soft and flaccid in consistency. The right auricular wall was thinned, and the cavity dilated. The tricuspid orifice admitted five fingers; the leaflets were normal. The right ventricle was enlarged and its wall diminished in thickness. The chambers of the right side of the heart were also dilated. The mitral orifice admitted four fingers; the leaflets were thickened. The aortic valve was well preserved.

The lungs were edematous, somewhat emphysematous and slightly pigmented. The bronchial and mediastinal glands showed nothing peculiar.

Abdomen.—No ascites or peritoneal adhesions were in evidence, but the mesenteric and peritoneal lymph glands were slightly enlarged.

Liver.—Weight 1,700 grams. The surface of the organ was

smooth, and the capsule slightly thickened. It was of a brownish yellow and soft in consistency. The Prussian blue reaction for iron was readily obtained. The gall bladder contained about 20 c.c. of dark yellow colored bile.

The spleen weighed 350 grams. It was slightly enlarged, and the capsule somewhat thickened. The pulp was soft and dark red in color. The macroscopic reaction for free iron was positive. The pancreas appeared normal.

The stomach was slightly dilated and atrophy of the mucous membrane in evidence. The intestines were similarly dilated and the mucosa atrophic.

Genito-Urinary Tract.—The right kidney weighed 220 grams, and the left 250 grams. Both kidneys were slightly enlarged. The capsules stripped readily, the surfaces were smooth and of a grayish-white color. On section the cortices were somewhat thickened and of a uniform pallor, similar to that of the surface. The medullary portions were of a dull red color. The bladder and prostate showed no abnormalities.

The bone marrow presented a dark red appearance, and microscopically hyperplasia was in evidence.

Head.—The calvarium was symmetrical and the wall thinned. The dura was not adherent, thickened or discolored. The cerebrospinal fluid was slightly increased. The pia in general seemed normal, although some opacity was discernible over the base of the brain.

Brain.—Weight 1370 grams. The brain appeared somewhat edematous, but the convolutional configuration was good. The basal vessels were well preserved and no abnormalities were perceptible. The lateral ventricles were not dilated, and the ependymitis was absent. Some of the cerebral veins were slightly distended.

Spinal Cord.—The membranes of the cord were not visibly altered, and the spinal nerves seemed in good condition. The cord was firm throughout and no deformities, shrinkage or softenings could be detected. Upon section, however, the posterior and lateral columns were obviously darker than normal.

Microscopical Study

Pieces from various regions of the brain and spinal cord were treated with the following reagents: Formol, alcohol, Müller's fluid, Weigert's mordant and Orth's fluid.

Different methods of staining were utilized, viz.: Nissl's, Mallory's, Mann-Alzheimer, Van Gieson's, Marchi's, Weigert's, Herxheimer's, toluidin blue, cresyl violet, thionin, etc.

Examination of sections from the cervical and dorsal cord by the Marchi method shows definite degeneration in the posterior columns, and a light-grade diffuse alteration is visible in the lat-

eral tracts. In the lumbar region a small flask-shaped area of
degeneration is present in the center of each posterior column.

Histologically round, oval or irregular aggregations of black
or grayish-black masses are perceptible. A nucleus is usually seen
lying among the granules and surrounded by a free area. Many
of the aggregations are composed of fine regular particles; others
of small round symmetrical drops, while others contain a large
mass encircled by a few smaller granules. Groups consisting of
large masses only are encountered, and here and there ring-like
formations are visible most frequently around the periphery of
the fatty aggregations. These formations are not infrequently
yellowish in color, and granules of a similar tinge are encountered
apparently imbedded within the large dark masses. Lying within
the perivascular spaces fat droplets of various sizes and shapes
are seen. These are distributed in irregular quantities along the
course of the vessel. The large black particles predominate in the
anterior part near the central canal; only a few fatty drops being
in evidence. In the outer part of the zone of degeneration groups
of regularly shaped small round drops are perceptible. The me-
dian zone contains aggregations of granules and fine particles inter-
mingled. Masses surrounded by fat drops, are also encountered.

In longitudinal sections the products of degeneration appear as
rows and groups of granules. It is readily discernible in prepara-
tions which have been counterstained that the disintegration prod-
ucts are for the most part within the cytoplasm of glia cells.
Large proliferating glia cells construct a thick network between
the disintegrated nerve fibers.

The area of degeneration does not present as uniform an ap-
pearance in sections stained with the hematoxylin-van Gieson
method. Considerable variation in the microscopical picture ex-
ists in different parts of the area. In the anterior portion and
along the borders of the zone the glia net appears distended, and
within the dilated meshes swollen medullary sheaths and axis cyl-
inders are seen; and occasionally normal nerve fibers are encoun-
tered. The proliferated glial processes usually appear homoge-
neous. The cells, in cross section, are spider-like in character and
contain one or more large pale swollen nuclei with granular nucle-
oli. The cytoplasm around the nuclei is indistinct, or frothy. In
many places, especially towards the median part of the area of
degeneration, a granular disintegration or rarefication of the homo-
geneous glia substance is perceptible, and in other instances a syn-
cytial structure is visible. The reticulum is seen to envelop groups
of nuclei and the glia septa between the particles of detritus. In
general, along the borders of the glia network where products of
degeneration are abundant, crescent-shaped Körnchencells are nu-
merous. Körnchencells of various sizes and shapes are likewise
frequent, and massive stellate glia cells with extensive processes

are encountered. Large Körnchencells containing vacuoles, myelin and axis-cylinder rests are in evidence.

In the periphery of the area a number of cells are seen representing an early stage in the development of the Körnchencells. They have become rounded in contour, lost their delicate processes and lie free within the reticular structure. The majority, however, still retain their attachment to the glia by slender protoplasmic threads. A few irregularly shaped Körnchencells are also observed with an exceedingly coarse cytoplasmic network, and containing many spherical particles of myelin. The nuclei deviate considerably in their appearance, but in newly developed Körnchencells are large, round and pale, or sometimes oval with a fine granular net-like nucleoplasm and nucleoli. Cells which show regressive nuclear changes are perceptible. The nuclei of these cells are notched, shrunken or indicated only by a few remaining granules. The greatest degree of glial proliferation obtains in the median part of the area. Here the large indented stellate cells with distended irregular nuclei predominate, but small cells are also in evidence. Many scavenger cells are seen lying within the meshwork surrounding the blood vessels.

With the Weigert and Weigert-Pal myelin-sheath stains, the zone of degeneration assumes similar dimensions to that described by other methods. Closer study discloses comparatively few darkly tinged particles in the periphery of the area, but toward the inner part they are abundant. Körnchencells and their relationship to the reticulum is readily discernible. The cells with fine net-like cytoplasm rarely contain granules, but those which exhibit coarse meshwork are usually filled with products of disintegration.

With Sudan III stain numerous Körnchencells filled with fat are seen in the area of degeneration. The cells are either round or oval, mostly filled with red colored drops, and possess one or more nuclei, which usually appear shrunken. In longitudinal sections the cells are collected into rows of irregular length. Some are completely filled with fat, while others contain an inconsiderable amount. Occasionally large dark red masses are seen, having numerous smaller granules in their vicinity.

By the Mallory aniline blue method a network is visible in the degenerated region which appears to proceed from the glia cells, occasionally large vacuoles are perceptible in these cells. The nuclei are distorted and pressed towards the periphery of the cell body by the fat vacuoles, and are surrounded by only a small rim of protoplasm. Numerous thin fiber-like processes are seen connecting the cytoplasm of different glia cells. The Körnchencells are of various sizes and shapes, and show considerable diversity in their structure. The meshwork may be uneven and relatively thick, or in other cells fine, small and circular in character. Delicate prolongations are perceptible radiating from these cells into the neighboring tissue. The cytoplasm is occasionally collected only

at the poles of the nucleus giving the cell an elongated aspect.
Many of these glia cells show an unmistakable tendency to become
rounded in contour, especially those in which the cell body no
longer appears homogeneous or the meshwork regular. The proc-
esses of these cells gradually disappear, the remaining protoplasm
in the vicinity of the nucleus vanishes and is replaced by a net-
work, and the nucleus becomes notched and shrunken. It is evi-
dent that these cells become separated from the surrounding syn-
cytium and transport products of disintegration from the ecto-
dermal tissue to the mesodermal vascular system, constituting
the most constant and characteristic type of gliogenetic scavenger
cell. Quiet frequently large fat vacuoles are seen lying within the
cytoplasm of glia cells which possess unusually prominent proc-
esses. Such processes not infrequently terminate in the walls of
capillaries as triangular shaped formations, or merge into the
neighboring tissue. The type of Körnchencells under description
is found in considerable numbers in the region of blood vessels
associated with a filamentous structure apparently of glial origin.
The changes observed in the vicinity of the capillaries are interest-
ing. Some cells are seen which present a fringed aspect, resulting
from the·singular relationship between the filamentous processes
and the network of cytoplasm. Considerable diversity is exhibi-
ted in the number and size of the meshes, the form of nuclei, and
the thickness of the processes. These cells obviously represent
transitional types of Körnchencells. It would appear that the fat
contained within many of the gliogenous Körnchencells is reab-
sorbed by other cells, and the former are eventually restored, and
resume their function as supporting elements of the nervous system.

The nerve cells of the gray matter were carefully examined at
various levels of the cord by the Nissl stain. With this method
the area of degeneration in the posterior columns is also quite per-
ceptible, and the cellular changes readily descernible.

The majority of the anterior horn cells in both the cervical and
thoracic regions show no obvious alteration. In some of them,
however, evidences of a degenerative process is visible. A num-
ber of these cells appear shrunken, elongated and stained more
deeply than usual. In such cells the nucleus is, as a rule, unal-
tered. The pigment in a few instances is abnormally increased,
other cells are somewhat swollen, their nuclei eccentrically situ-
ated, and chromatolytic changes present. The alterations are more
intense in the cells of the posterior horns. Some of the cells are
swollen, their outlines are very irregular and complete disintegra-
tion of the tigroid substance has occurred. The nucleus is dis-
tended and the nucleolus stains poorly. In other cells the nucleus
is sometimes shrunken and difficult to distinguish from the cyto-
plasm owing to the fact that it stains uniformly throughout. A
number of the cells of the lateral horns are considerably altered,
showing extensive chromatolysis with displaced nuclei. The capil-

laries of the gray matter appear, in many instances, distended. A slight pial thickening is evident in the cervical region, but otherwise the meninges of the spinal cord are not altered.

The pathological changes in the pons are less intense than in the spinal cord. In the region of the pyramidal tract and the median fillet myeloclasts and a slight increase of the glia is perceptible. A few degenerated ganglion cells are likewise not infrequently encountered. In the red nucleus nerve cells showing fine granular disintegration of the chromatin usually associated with swelling of their cell bodies are occasionally seen.

In the medulla oblongata a diffuse but rather light grade degeneration is evident. In the olives and restiform bodies groups of degenerated nerve cells are seen in a few instances. The pathological alterations occurring in some of the ganglion cells are not unlike those described. Chromatolysis is the most frequent and characteristic change; more often of a peripheral than a central type. Sometimes disintegration of the Nissl substance is observed only in the protoplasmic processes.

Numerous sections from various parts of the brain were prepared by different methods of staining and carefully investigated. The changes in the frontal region are most discernible in the pyramidal and ganglionic layers. Some of the ganglion cells are well preserved, but the majority of them are altered. The nuclei are unusually large and filled with lightly stained granules. In proximity to the nuclei the cytoplasm presents a loose net-like structure, but around the periphery, and especially in the apical processes, contains numerous pale particles. Many of the pyramidal cells are swollen, and the alteration in their appearance is quite characteristic. The perinuclear cytoplasm has apparently in a number of instances undergone shrinkage, succeeding its initial distention. The dimly stained cell bodies and processes are entirely filled with pale ill defined granules, among which irregular masses of a more intensive color are frequently seen. The nuclei are voluminous and the nucleoli prominent. The nuclear membrane is sometimes scarcely distinguishable from the cytoplasm, but generally is more deeply tinged. In many of these cells, however, the nuclear membrane is exceedingly delicate, and the caryoplasm contains granules which so closely resemble those in the adjoining cytoplasm, that the limits of the nuclei can scarcely be determined. In addition to these alterations, a few cells which show a general shrinkage are encountered.

With Bielschowsky's method the axis cylinder processes are well preserved. Even in advanced nerve cell degeneration the neurofibrils are apparently but slightly affected. The reticular alteration occuring in some cells is quite distinctly demonstrated, but the neurofibrils in most appear intact.

An increase of the glia in this region is not pronounced, but progressive changes in much of the neuroglia are evident. The

alterations in the nucleus and protoplasmic structure are analogous to those observed in other areas. Gliogenic ameboid cells are sometimes seen, and a few glia cells showing regressive stages are visible.

The adventitial and endothelial cells of the cortical vessels, in some areas, contain yellowish-green pigment. These pigment granules are larger and more angular than those observed in the nerve cells. The adventitial spaces, especially of the veins, contain considerable lipoid substance.

In the precentral gyre, certain alterations are present, more obvious in some areas than in others. While a few of the Betz cells appear normal, a number of them are to a greater or less degree affected.

In many degenerative cells the nuclear membrane loses its usual affinity for the stain and is indistinct; the nucleolus stands out prominently and a pale ill-defined mass is discernible surrounding the nucleus. The structure of this substance simulates that of the altered nucleus causing the latter to appear enlarged. The cytoplasm of the cell is frequently more intensely tinged than normal and assumes an indefinite granular aspect rather than a reticular structure. The nucleoli in most cases exhibit alterations in contour and often contain small vacuoles, when extensive cellular disintegration is present. In certain parts of the cytoplasm, areas are seen which display peculiar changes. The stainable substance has undergone absorption and a granular net-like structure is perceptible. Considerable lipoid substance is to be found within a large proportion of the cells. These granules of fatty material have a pale lemon yellow tint by the Nissl method, are irregularly disposed and bear no definitely constant relation to any one part of the nerve cell or its processes, but vary in concentration and size.

With Herxheimer's method this substance presents a characteristic appearance, the individual minute particles staining a reddish color. They are mostly distributed in contiguity to the nucleus, especially its basal portion. In other instances, however, the fatty granules are seen around the sides of the nucleus, occupying a position between it and the darkly stained periphery of the cell.

Sections stained by the Bielschowsky method for the neurofibrils show but little alteration in these elements. The course of the neurofibrils is seen to be somewhat influenced, however, by the presence of the lipoid granules. A granular appearance of the neurofibrils is seen in some cells. Cellular disease of this type is more pronounced in some areas, but is encountered throughout this region in varying degrees of intensity.

Chronic disease of the nerve cells is also in evidence. This type of alteration is generally distinguished by an angular darkly stained nucleus and an enlargement of the nucleolus. The processes are thin, usually tortuous and visible for a considerable distance. The cytoplasm in some cells presents a peculiar granular appearance,

and in others contains numerous vacuoles. The changes in many of the cells are characterized by a more or less general shrinkage, and the cytoplasm and processes are filled with darkly stained coarse granules. The shrinkage is quite extensive in some instances so that the cell appears rather elongated. Combined types of ganglion cell degeneration sometimes occur.

With toluidin blue the neuroglia tissue is undoubtedly somewhat increased. Large glia cells having a distended lightly stained round nuclei are seen. Occasionally they are disposed in groups. Sometimes the nuclei of such cells are elongated and the cytoplasm at the poles deeply stained, so that they assume a rod-like aspect. Progressive neuroglia changes are constantly evident in the vicinity of degenerating ganglion cells, the intensity of the glia proliferations apparently corresponding to the degree of the cellular alterations. These glia cells are perceived in the various layers of the cortex, here and there as small aggregations surrounded by an ill-defined reticular protoplastic structure, small round granules are usually found within the meshes of the reticulum, but quite frequently large irregularly shaped masses are present. In many instances the material within the cytoplasm stains a yellowish or yellowish-green color. In sections of the motor cortex stained by the Weigert-Pal method, it is obvious that neither the tangential layers of fibers nor the supraradiary and intraradiary plexuses are altered to any extent. The pathological changes in the cells of the temporal region correspond to those observed in the frontal gyri, but are somewhat less extensive.

The cellular alterations in the cornu ammonis are likewise interesting. The changes are chiefly confined to the stratum oriens and pyramidal cell layer. Certain more or less circumscribed areas are severely affected, whereas the cells in the adjacent tissue appear normal. Several types of nerve cell degeneration are observed. The nuclei in many cells are spindle or flask-shaped and intensely stained. Not infrequently an exoplasmic-like zone is discernible around the nuclei. The nucleoli are hardly visible within the dark homogeneous caryoplasm. When the degenerative process has reached an extreme stage, only slight or no traces whatever of normal elements are discernible in the cell bodies. The cytoplasm and somewhat tortuous protoplasmic processes present mostly a uniform aspect; but careful examination reveals the fact that their structure is composed of closely compressed palely tinged granules. The bases of the pyramids are angular and the basis process indistinct. Other cells within the affected regions show rarified areas within their cytoplasm, surrounded usually by a more deeply stained border, and which apparently represent beginning vacuolization of the cell body. Similar areas, but of a more irregular contour, are also seen in the processes. Ofttimes fine very dark granules are seen scattered through the protoplasm, probably products resulting from a metamorphosis of the unstainable substance.

On the other hand certain cells display a reticular-like degeneration.

Neuroglia proliferation is present where nerve cell diseases exist, chiefly of a progressive character. The membrana glia superficialis is not perceptibly thickened. In general only a moderate degree of proliferation is evident, but glia cells with large nuclei, distended metachromatically stained nucleoli, and a rather copious reticular cell body are visible. The nuclei of many cells are more darkly stained and normal in size, but around their periphery excessively tinged granules are distributed or scattered through the caryoplasm producing a stippled aspect. Sometimes the granules are closely massed together causing the nucleoplasm to appear homogeneous.

In the occipital cortex changes are perceptible in the majority of the nerve cells, but rather light grade in character. The cells in general are somewhat more deeply stained than normal, and the net-like structure of the cytoplasm less distinct than usual. Within the meshes faintly stained masses are discernible. A slight degree of alteration also obtained in the nuclei of many nerve cells, which is chiefly distinguished by a pale diffuse staining, but otherwise no distinct structural alteration is visible. The nuclei of the smaller cells, which normally have a greater affinity for the stain than those of the larger cells, show no deviation from the normal. Besides the above described apparently inconsiderable changes, a number of cells are encountered displaying transitional stages of degeneration, until nothing remains but an indistinct profile of the cell body, which occasionally contains a few more or less sharply defined vacuoles. In the upper layers of the cortex some cells are severely altered, and acute degenerative changes are not infrequently met with.

The neuroglia tissue throughout the cortex in this region is but little altered. Glia cells with darkly stained or pycnotic nuclei are seldom in evidence. Likewise relatively few cells with large pale nuclei are seen. The nuclei of such cells often show a metachromatic tinctorial reaction and centralization of the chromatin. Proliferating glia is occasionally encountered. In other instances regressive changes are perceived, as indicated by the small angular-shaped homogeneous appearance of the nuclei and degeneration of the cell body. Examination of the basal ganglia shows no pronounced degenerative changes in the neurons of this region.

The white matter of the hemispheres was investigated by the Nissl, Marchi, Mann-Alzheimer, Mallory and other methods. In the subcortical white matter of the motor and frontal regions disintegrating fibers are occasionally seen. With Marchi's method these degenerating fibers are often perceived as rows of fat granules, or in cross sections sometimes present a radiative appearance. In counterstained sections, it is readily demonstrated that

these masses are inclusions within the protoplasmic structure of metamorphosing glia cells. The Mallory and Mann-Alzheimer methods show the complicated cytoplasmic structure of these cells, and a fine rather uniform meshwork can be traced through their protoplasmic cell bodies. The net-like cytoplasm is frequently copious and extending into the surrounding area, gradually merges with similar elements, so that its limits cannot be defined. Lying near the nucleus of some cells, large round or oval-shaped vacuoles are apparent. Such cells often possess long thick processes, which penetrate the neighboring tissue, and undoubtedly play an important rôle as supporting structures. Glia cells with small dark nuclei and delicate cytoplasm are also in evidence. A similar microscopic picture is discernible with the Nissl stain.

Cerebellum.—No change of any significance could be detected. only a few of the Purkinje cells are altered, and but slight increase of the neuroglia elements is appreciable.

General Pathological Summary

The brain appeared somewhat edematous, but its convolutional pattern was normal. There was no disease of the membranes. other than slight opacity of the pia-arachnoid in the interpeduncular space. The cerebral vessels showed nothing abnormal, although some of the veins were distended.

Microscopically pathological alterations were discernible in both the cortex and white matter of the hemispheres. The changes in the cortex from a cyto-architectonic point of view were most intense in the precentral and frontal regions. A swelling of the ganglion cells was the most frequent alteration observed, but various types of cell disease were encountered, invariably associated with hyperpigmentation.

An increase in the neuroglia tissue was not pronounced, but progressive changes in the glia were in evidence, characterized in some instances by proliferation and enlargement of the nucleus, a greater intensity in the staining reaction of the cytoplasm with a deposition of basophilic substance and the formation of small aggregations surrounded by an ill-defined reticular protoplasmic structure; and in other instances by the formation of fibers. The intensity of the glia proliferation apparently corresponded to the degree of cellular alterations.

In reference to the medullated fibers of the cortex, neither the tangential fibers nor the supraradiary and intraradiary plexuses were altered to any extent.

A careful investigation of the white matter revealed subcortical areas of fiber degeneration principally confined to the motor and frontal regions.

Sections from the cervical and dorsal cord showed definite degeneration of the posterior columns and a light-grade diffuse alter-

ation was perceptible in the lateral columns. The degeneration
was most extensive in the cervical region affecting here the whole
of the posterior columns except a narrow rim bordering the pos-
terior commissure and horns, and gradually becoming less pro-
nounced towards the lower cord. In the lumbar region a small
flask-shaped area of degeneration was present near the center of
each posterior column. The degeneration was of an irregular
character throughout the entire length of the cord, and presented
a somewhat patchy distribution, often varying at different levels.
The posterior roots were not affected. The changes in the lateral
columns were not as well defined as those involving the posterior
tracts, but were likewise most evident in the cervico-dorsal region.
The degeneration was less regular and more patchy in distribution
and while not extending over so great a length of the cord, was,
however, discernible to a slight degree in the lumbar region.
Neither the ventral spino-cerebellar nor the anterior pyramidal
tract was altered. In the degenerated areas a disintegration of
the medullary sheath and axones of the nerve fibers occurred,
associated with an increase of the neuroglia tissue. No hemor-
rhages were apparent. As regards the gray matter, most of the
cells in the anterior horns were unaltered, but in some of them
evidences of degeneration were perceptible. The cells of the pos-
terior appeared somewhat more intensely altered. The capillaries
were in many instances distended, but the vessels of the cord in
general showed no special abnormalities.

The pathological study of this case is of special interest and
value, since anatomical alterations not only occurred in the spinal
cord, but were demonstrable in the brain.

The changes affecting the nerve cells in the brain and spinal
cord simulated those alterations of the neuronic elements which
are encountered in states of chronic and subacute toxemia, and
obviously resulted from the action of the same toxic agent re-
sponsible for the degenerative changes in the white matter.

Only a few cases of this affection are recorded in the literature
which exhibited cerebral lesions. Biruljas reported a case in which
an examination of the brain showed small hemorrhages and de-
generative changes in the ganglion cells. Similar alterations have
been found by Ransohoff. More recently Lube has observed foci
in the cerebrum and cerebellum analogous to the areas found in
the spinal cord.

The degeneration which occurs in the spinal cord assumes the
character of what has been termed pseudocombined sclerosis and
has been described by most authors as a patchy, or irregular de-

generation and sclerosis confined to the posterior columns, or not infrequently combined with a similar process in the lateral tracts.

A number of views have been advanced regarding the etiological and pathological factors in this affection, and the spinal cord changes have been attributed to several different pathological processes.

Some of the earlier writers (Minnich, von Noordan, Teichmuller) were of the opinion that the sclerosis resulted from a coalescence of multiple small hemorrhages. This hypothesis does not, however, appear to be well founded, as many subsequent investigators have failed to detect the presence of hemorrhages, nor could any evidence of hemorrhagic extravasations be discovered in the case considered in this paper. It is also apparent that when hemorrhages have been observed they were too small, few in number and irregularly scattered to be regarded as accountable for the production of degenerations, affecting in many instances a large part of the spinal cord. On the other hand, should large hemorrhages occur in the cord which interrupted parts of similar tracts on either side, there would be evidences of ascending degeneration of certain tracts above such lesions with their partial escape at least below them, and of descending degenerations of other tracts below the hemorrhages, with partial or complete escape of the same tracts above them. Hemhorrhages of this character have not been described, and the distribution of the degenerations in the spinal cord contraindicates such a possibility. It should be remembered that in the majority of the cases, the degeneration both in the posterior and lateral columns is most marked in the cervical and upper thoracic regions of the cord and decreases in extent and intensity towards the caudal extremity.

A consideration of vascular alterations as a possible factor in the production of the degeneration seems appropriate, since various degrees and types of vascular disease have been described in severe anemia.

Thickening of the walls of blood vessels, producing secondary changes in the nerve tissue, has been suggested (Nonne, Redlich, Minnich). Although areas of degeneration surrounding vessels have been found, such areas have as frequently occurred independent of the blood vessels, and there seems to be no justification for the assumption that the affection has a vascular origin, in the

sense that the vessel walls are primarily diseased and the nerve elements secondarily involved.

Thickening of the vessels would unquestionably cause a diminished permeability of their walls, and in such instances disturb the nutrition of the areas supplied by the vessels and a consequent impoverishment of the nerve tissue, but that this should be considered per se as the prime etiological factor seems most improbable.

Thrombosis of the spinal cord vessels has been described by some writers (Dana, Henneberg, Petren), and it is interesting to note that when transverse softenings occur in the spinal cord, apparently due to thrombotic disturbance, they appear to have a predilection for regions similar to those most extensively involved in pernicious anemia, which might lead one to assume that the cervical upper thoracic regions of the cord are less efficiently supplied with blood than other parts.

Anatomical data, however, do not seem to support the assumption as most of the evidence at hand indicates that the lower part of the dorsal as well as the lumbar and sacral regions of the cord, are not as well supplied with blood not only owing to the fact that this portion of the spinal cord is most distant from the origin of the anterior and posterior spinal arteries, which arise from the vertebral arteries within the cranium, but because the arteries which pass to the spinal cord via the nerve roots have a longer and more vertical course to this part of the cord.

The seemingly plausible vascular theory of Marie, which attributes the simultaneous affection of tracts in the dorsal half of the spinal cord to a lesion of the posterior spinal artery, is also untenable, as researches regarding the vascular topography of the spinal cord preclude this presumption. Jakob and Moxter, in a series of five cases found an intense intima proliferation, in some instances obliterating the lumen of the vessel. This proliferation not only involved the vessels in the degenerated regions, but occurred through the entire spinal cord, and doubtless represented an independent process.

If the vascular disease were invariably confined to the areas of degeneration, a relationship between the two processes might be indicated.

It has been proposed that the alterations in the coats of the vessels, described by some writers, were the result of the same

toxic process which had produced disintegrative changes in the nerve fibers. This hypothesis which apparently premises that the toxin permeates the vessel walls without injury to their structure, causes a degeneration of the surrounding tissue, and a subsequent alteration in the coats of the vessels, offers no adequate explanation, as it seems unlikely that a toxin capable of effecting in a comparatively brief period of time, extensive morbid changes in the nerve tissue, would fail to occasion initial vascular lesion. Nonne has referred to the possibility that a perivascular lymph stasis, demonstrated by distension of the perivascular spaces, may through pressure and irritation of the vessel walls induce proliferative processes terminating in sclerosis. Dilatation of the perivascular spaces can hardly be considered as indicative of lymph stasis, and it is most probable that in such instances the distention was the result of post-mortem changes or the action of fixatives.

In the more recent literature, however, a number of cases are recorded in which the vascular alterations are inconsiderable in character, the prevailing type consisting of a slight adventitial swelling and with a normal condition of the media and intima. Proliferative changes in the intima have been rarely described, and but few authors have observed any evidence of inflammatory processes affecting the vessel walls.

The vascular alterations in our case were also of a trifling nature, and could not be regarded as bearing any etiological significance to the degeneration in the spinal cord.

The slight distention of the lymphatic spaces of the vessels, as well as the associated adventitial changes, while not constantly present, can be readily comprehended when the histological features of the reactive process in general are analyzed. The morbid changes in the white matter of the cord were characterized by degeneration of the nerve fibers, with a compensatory glial metamorphosis tending to terminate in sclerosis. This process was distinguished by several stages and numerous transitional types of gliogenous phagocytic cells were discernible. Many of these cells were laden with products of disintegration, to be conveyed from the ectodermal tissue to the vascular system; and it was observed that where these cells accumulated about the blood vessels, the lymphatic spaces were filled with the detritus, and in consequence enlarged. The cytoplasm of the adventitial cells contained similar material. Hence it is obvious that the distention of the vas-

cular lymph spaces and the adventitial alterations, represent but
the activity of the vessels as participants in the disposition of
waste products.

Myelitis was considered as the fundamental etiological process
by Nonne and others. A number of investigators, however, have
failed to detect any changes in the spinal cord characteristic of
what might be considered as a myelitic reaction; and, the reasons
advanced in discussing why the degenerations were not the result
of hemorrhages, are relevant in the case of myelitis.

The alterations in the white matter have been regarded as con-
sequent to a primary disease of the gray matter (Rothmann, Boe-
decker, and Juliusberger). There is considerable evidence against
the acceptance of this inference. It seems more likely that the
elements of the gray matter are affected simultaneously with, or
subsequently to those of the white substance, through the activity
of the same toxin.

Combined tract degeneration has also been observed in a num-
ber of toxic, cachectic or anemic conditions. Changes in the spinal
cord have been reported in leukemia (Bloch and Hirschfield,
Nonne, Müller); chronic alcoholism (Vierodt, Redlich, Braun);
arsenic poisoning (Dana); diabetes (Williamson); lead poison-
ing (v. Monakow); pellagra (Marie); ergot poisoning (Tuc-
zec); etc. Such observations lend support to the theory that a
toxic agent is responsible for the tissue changes. To explain why
in many cases some parts are affected and others escape, it seems
most reasonable to assume that all parts of the nervous system
are not equally vulnerable to the deleterious effect of the same
toxin.

The conclusions to be deducted from this study, are that cere-
bral alterations can be demonstrated in progressive pernicious
anemia, and that in cases with psychical phenomena, changes in
the cortical neurones occur similar to those found in the psychosis
of toxemic origin.

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Society Proceedings

DOUBLE CERVICAL RIB NERVE SYMPTOMS: SURGICAL REMOVAL

By S. P. Goodhart, M.D., and Alfred S. Taylor, M.D.

The patient was a woman, 30 years old, whose history, both family and personal, was entirely negative from a neuropathological point of view. Symptoms referable to the cervical ribs dated apparently from the patient's eighth year, when she began to suffer from pains in the left shoulder radiating down the arm, and the entire left upper extremity would become paroxysmally numb. There was also a gradual development of an indefinite sense of discomfort about the left shoulder and a protrusion of the left shoulder blade, which, when pressed upon, gave rise to varying degrees of pain and numbness extending through the arm. These symptoms persisted, and in the course of a few years there was added a certain inability to properly use the left index finger, noticed particularly in playing the piano, and gradually a lack of dexterity of the left hand. During her 18th year she noticed that certain movements of the arm, for example, arranging her clothing necessitating placing the arm behind her, caused flexor spasm of the muscles of the forearm and hand. At this time there was no weakness nor wasting of the muscles.

When the patient was 23 years old she observed weakness in the grasp and in the finer movements of the left hand, followed by progressive atrophy of the small hand muscles, both the thenar and hypothenar surfaces being involved. Soon afterwards a coldness of the left upper extremity, particularly from the elbow to the finger tips, was at times subjectively felt and could be objectively demonstrated.

The patient came to Dr. Goodhart in 1904 with the diagnosis of progressive muscular atrophy. At that time his examination revealed areas of hypesthesia and hyperalgesia irregularly distributed over the left forearm and hand. These areas varied and finally disappeared, leaving as the only sensory disturbance an area of hypesthesia for all forms of sensation in that part of the forearm and hand corresponding to the inner cord of the brachial plexus, particularly the ulnar distribution. At this time the left hand presented an appearance of the typical *main en griffe*, and some atrophy of the pectoral muscles was noted. Further physical examination revealed osseous tumors in each supraclavicular space, which were recognized as cervical ribs. The one on the left side was found two inches outside of the sternal insertion of the sterno-cleido-mastoid muscle, extending vertically upward two inches from the upper clavicular border.

On the right side a far smaller eminence was found in about the same position. The x-rays disclosed scoliosis extending from the 6th cervical to the 5th dorsal, with the convexity to the left side, and with a compensatory convexity below. Bilateral cervical ribs were seen attached to the bodies of the 7th cervical vertebra, articulating at their distal ends with a facet from the upper border of the first dorsal ribs. On the left side the supernumerary rib measured about one and three quarters inches; the right one about two inches in length.

About 1907 the patient began to observe a weakness in the right index finger and a certain lack of dexterity in executing finer movements with the right hand: slight occasional numbness of the right thumb was also complained of. Thus, involvement of the brachial plexus on the right side developed. Within the next few months numbness of the entire right leg and pains in the calf muscles were experienced by the patient, and Dr. Goodhart was able to detect at times a slight but manifest weakness in the flexors of the toes of the right foot, but there were no secondary nor electrical changes.

In May, 1908, the patient submitted to an operation for the removal of both false ribs, which was performed by Dr. Alfred S. Taylor. Upon exposure, it was seen that the subclavian artery crossed the first rib anteriorly and below the distal end of the cervical rib, the roots of the plexus lying over the false rib, as had previously been determined by palpation. The 8th cervical and 1st dorsal roots were undergoing the greatest tension and pressure. This coincided with the symptoms. The relation of the structures was about the same on both sides, and the upper roots were so situated as to be but little compressed.

Immediately following the operation there was paralysis of nearly all the muscles and the sensory surfaces supplied by the plexus on both sides. In the course of a week, motion and sensation began to return, and the improvement, though slow, was constant. About one year after the operation there was still considerable atrophy and very slight sensory changes over the inner surface of the forearm.

At the present time, about six years after the operation, there is marked improvement in the muscle supply.

Dr. Richard B. Kruna suggested that the persisting deformity of the hand and arm might be improved by a systematic course of exercises of the involved muscles and nerve tracts.

Dr. Charles A. Elsberg, in reply to an inquiry as to whether he thought this patient might be benefited by further operative interference, said her symptoms were incomplete and there was no reason to think there had been sufficient injury to the branches of the plexus to justify an operation which would necessitate a complete division of the nerve cords and subsequent suture. Through reëducation and systematic exercises, as suggested by Dr. Kruna, we might get other nerves to take up the function of the impaired muscles.

A CASE OF SPINAL HEMATOMYELIA OF THE HEMIPLEGIC TYPE

By Frederick Tilney, M.D., and C. L. Nichols, M.D.

The patient was a printer, 28 years old, who was admitted to the Coney Island Hospital on June 18, 1914, with the history that shortly

before admission, while diving in shallow water, his foot slipped and he
fell into the water almost perpendicularly. He did not recall whether
he struck the sandy bottom on his head, neck, or back, but thought
that it was on the vertex, posteriorly. He had to be dragged from the
water and was found to be suffering from a complete paralysis of the
right upper and lower extremities, and an awkwardness in the use of the
limbs on the opposite side. There had been no loss of consciousness and
he was perfectly oriented. His head was numb and the whole body felt
bruised and sore. The pain was most severe over the right shoulder, ex-
tending down the arm and forearm. There were no spasmodic move-
ments in this area.

When the patient was examined several hours after the injury he
still complained of the sensation of having been bruised, especially over
the right clavicle and upper chest. He was exceedingly sensitive from a
sharply defined point at the sterno-clavicular articulation outward to
nearly the tip of the shoulder. The right pupil was smaller than the left:
both were symmetrical and responded to light and accommodation. The
right side of the neck was moved with great reluctance, and posteriorly
there was a certain amount of rigidity. The right side of the chest was
less mobile than the left, and the breathing sounds over the former were
diminished. The heart's action was slow and regular and the sounds of
good character. The pulse was of fair quality and volume. The abdomen
showed no abnormalities. No reflexes could be elicited on the right side,
and sensation was absent, with the exception of variable areas of response
to pin prick. The field of vision was undisturbed. The fundus showed
slight congestion of the nerve; the margin was not well defined and the
vessels were slightly engorged, evidencing some pressure. The hearing
was affected on both sides.

On examination on June 25, one week later, the anisocoria was still
more apparent, the left pupil being larger than normal and reacting
promptly, while the right was smaller and sluggish. The patient was
placed on a water bed for two weeks, during which time the soreness
gradually cleared up and the paralysis improved. He was then permitted
to sit up, supported by pillows, and to use a mattress bed. Two weeks
later he was allowed to sit in a chair and ten days after that he was able
to walk. He remained in the hospital a month and a half.

On the first day after his discharge he had an agonizing pain on the
right side of the head over an area extending from the forehead along
the vertex in the median line to the occiput. This persisted for two hours,
gradually increasing in severity and then diminishing slowly after the
application of cold compresses. A similar attack, less severe, followed
a week later.

After the patient had been seated for any length of time he became
stiff in the right hip, and on arising had a dull pain extending from the
lower part of the spine forward into the right groin. This symptom had
been noticed irregularly, averaging once a day, since he had been per-
mitted to sit erect in a chair at the hospital. He also complained of a
similar pain extending from the cervical spine to the right shoulder. There
were no urinary symptoms. The bowels had moved regularly ever since
the accident.

Examination at the present time showed a flaccid paralysis of the
right upper extremity and a spastic paralysis of the right lower extremity.
The tendon reflexes on this side were greater than those on the left,

while the abdominal, epigastric and cremasteric reflexes were absent. The latter were present on the left side. The Babinski was positive on the right side, and there was permanent clonus in the ankle. A peculiar circumstance in connection with the case was that in eliciting the triceps reflex on the right side, percussion on either the tendon or the muscle produced flexion of the forearm instead of extension. The radiograph showed a fracture of the sixth cervical vertebra.

A CASE OF SPINAL HEMATOMYELIA: BROWN-SÉQUARD PARALYSIS

By Frederick Tilney, M.D., and C. L. Nichols, M.D.

The patient was a boy of twenty, an electrician, who was admitted to the King's County Hospital on November 10, 1913, with the history that just previous to admission, while climbing a tree, the branch broke, and he fell a distance of about ten feet, first striking upon his buttocks on a branch below, and then falling to the ground on his chest. He lay flat on his face, without losing consciousness, the fingers of both hands contracted spasmodically. None of the extremities could be moved voluntarily, and he felt as though a current of electricity had passed through him, leaving the body charged from the shoulders down. The right lower extremity seemed to contain a tremendous pressure, and a tingling sensation passed up the left leg, across the pelvis and down the other limb. The direction did not change.

Physical examination showed an apparently healthy and well-developed adult, rather nervous, with a slight tremor of the hands. The pupils were equal, and reacted naturally. The pulse was regular and of good volume. The heart sounds were normal. The respiration was chiefly abdominal, the chest moving very little. The arms could be moved, though very slowly and with great difficulty. The fingers were held in a position of partial flexion, with no power to either flex or extend them. The knee jerk was absent on the right side; present on the left. The Babinski could not be elicited. The toes of the right foot were red; those of the other pale, and the surface temperature of the left lower extremity was diminished. There was an absence of the cremasteric reflex.

There were marked sensory changes. There was tactile anesthesia in both lower extremities and in the trunk up to the second interspace. Pain sense was absent in the left leg and as far up as the third rib, but present over a corresponding area on the opposite half of the body, where it was apparently hyperacute. The temperature discrimination was entirely absent on the left side to a level a little below the clavicle, but was present on the right side, although the response to heat was not as good as to cold. There were sticking pains in the right leg, and the patient felt as though there was a strap around it and another around the shoulders, each being tightened in an opposite direction. There were fibrillary tremors on the left side. Priapism was present during the examination. Catheterization showed no evidence of hematuria.

One month later the patient had slight power of flexion of the left fingers. Sensation was unchanged. The pupils reacted promptly, but were unequal. The patellar reflex on the right side was exaggerated. One week later there was an involuntary urination. Up to that time catheterization had been necessary, but from that time on the control of the bladder was normal.

The lesion in this case was located in the upper cervical region. The radiographs demonstrated no fracture nor dislocation.

A CASE OF SPINAL HEMATOMYELIA OF THE PARAPLEGIC TYPE

By Frederick Tilney, M.D., and C. L. Nichols, M.D

The patient was a Russian tailor, 34 years old, who came to the Vanderbilt Clinic on September 16, 1914, complaining of inability to walk properly, with pain in the back when seated, swelling and coldness of the feet and lack of control of the bladder. The family as well as his previous history was negative.

Nine months ago, in an attempt to escape from a burning building, the patient either fell or jumped from a fire escape, a distance of two stories. He was picked up in an unconscious state and removed to the Gouverneur Hospital. He remained unconscious for two hours—perhaps longer—and on recovering his senses he was unable to move either lower extremity and had retention of urine. He remained in the hospital for six weeks, with slight improvement. He was then taken to the Beth Israel Hospital, where he remained three months and where some operation was done. Following this his condition improved and he regained some power to move the legs. He was now able to walk, with some difficulty.

Examination at the present time showed normal cranial nerves and normal reflexes, with the exception of those at the patella and ankle, which were exaggerated. The station was unsteady and the gait spastic. Motor power in both extremities was defective, with some atrophy of the muscles. There was a fine tremor of the hands and tongue. There was an area of anesthesia over the left gluteal region.

Dr. Frederick Tilney, who had seen the first two cases of Dr. Nichols in their early stages, said that in both instances he had concluded that the condition was due to hemorrhage into the cord. In the second case, that showing the Brown-Séquard syndrome, the question of an operation was considered by Dr. Arthur C. Brush who advised against it. The improvement in this case was so marked during the first three months after the injury that further delay was advised, and the patient was now able to walk, whereas when he was brought into the hospital he was completely paralyzed. In the first case, the patient with hemiplegia following a diving injury, the radiograph showed a fracture of the sixth cervical vertebra, but this was of such a character that the symptoms seemed to be due to hematomyelia rather than to a cerebral injury or a crushing of the cord. In this case an expectant plan of treatment was also followed and the patient had improved steadily.

One of the reasons why these cases were shown here tonight, Dr. Tilney said, was to get an expression of opinion from the members as to whether early operative interference was advisable in dealing with injuries of this character.

Dr. William M. Leszynsky said that in cases of traumatic lesions of the cord, of which he had seen a large number in hospital practice, the question of operation usually came up for discussion, and in answering it he had been largely guided by the clinical manifestations. If either by

palpation or the x-ray it could be shown that we were dealing with a fracture dislocation producing crushing of the cord, as evidenced by complete motor and sensory paralysis and abolition of reflexes below the lesion, an operation was inadvisable. When blood is found in the cerebrospinal fluid, the hemorrhage is usually subdural. When the cerebrospinal fluid is clear, as in hematomyelia, operation is not indicated.

In many of these cases, Dr. Leszynsky said, the early residual symptoms often became permanent, their severity depending upon the amount of damage done to the cord. It was impossible to give a positive prognosis as to the ultimate outcome.

Dr. Benjamin Rosenbluth said that the first case presented by Dr. Nichols he had seen at the Beth Israel Hospital, the man had been previously treated at the Gouverneur Hospital and was brought in with a complete flaccid paralysis of the lower extremities, anesthesia, loss of reflexes and localized pain over the spine. He was put in plaster but this proved so painful that it had to be taken off. Several radiographs were taken with no definite findings. A localized injury involving the body of the vertebra and transverse processes and possibly the cauda equina was suspected, and when the spinal canal was opened over the region of the cauda the nerves were found to be pushed about in all directions and there was a large collection of cerebrospinal fluid. This pressure was relieved and the man made a good recovery so far as motility was concerned, but he still had an area of anesthesia over the thighs. Dr. Rosenbluth said that was the fourth case of injury of the cauda equina that had come under his observation, and the result of the operation was the most encouraging he had seen. The symptoms were not hemiplegic, and his result showed a larger sensory disturbance than reported.

Dr. J. F. Terriberry, in reply to Dr. Tilney, said that in cases where one could be fairly certain that there was a hemorrhage within the cord, little could be expected from operative interference. This could perhaps be determined by the x-rays together with the clinical history. In the cases shown by Drs. Tilney and Nichols the history clearly indicated a hemorrhage into the cord itself, and under those conditions no benefit could be derived from an operation. The spinal cord is a very sensitive organ, as we all know, and any injury to it might be aggravated by operative interference. These cases, as a rule, did much better under proper general care, with subsequent reëducation of the lost muscular function if the residual symptoms demanded it. The fact should be borne in mind that this loss of function was sometimes attributable to a stiffening of the joints of the hands and fingers, which often did much to retard the reparative process, and it was only with care and perseverance that one could get the most out of these cases.

A CASE FOR DIAGNOSIS

By A. Skversky, M.D., and Smith Ely Jelliffe, M.D.

The patient was a child, seven and a half years old, of normal birth, who sat, talked and walked at the proper ages, and appeared to develop normally. She had measles at the age of three years, with an uneventful recovery. Six months later she was said to have had a high fever one night, but no residuals followed. Five weeks after this, without any

premonitory symptoms and without convulsions, she had a sudden loss of power on the left side of the body involving both extremities and the face, without speech disorder. Two weeks later, according to the mother's description, she had epileptiform seizures, apparently Jacksonian, for they began in the left lower extremity, ascending, involving the upper extremity and face, and terminating in a generalized convulsion. This occurred only once, and following this her hemiplegia was said to have disappeared and she was perfectly well for three months, when she began to have irregular involuntary movements of the extremities on the left side, accompanied by some difficulty in walking. This had been becoming slowly but progressively worse.

For the past year she had headaches at irregular intervals, but excruciating, and lately they had become more continuous and dull, usually localized in the right frontal region. She had also complained somewhat of dizziness. There was occasional nausea, but no history of vomiting. There had been no difficulty with vision or hearing. The mother claimed that the child's speech had always been somewhat drawling and monotonous. She was rather bright, but had received no schooling and became emotional by slight stimulation. For the past month she had had some difficulty with bladder control, with occasional incontinence of urine.

When the patient was brought to the Post-Graduate Hospital, about a month ago, her chief complaint was difficulty in walking. Examination showed a well developed and nourished child. Her mental level, according to the Binet-Simon rule, was only a little less than a year below her age, and she was therefore not feeble-minded. There was marked ataxia, with mild left hemiparesis. The more important positive neurological findings were as follows: The head was usually inclined towards the right, and the face tilted towards the left. Vision was normal, but the fundi presented double optic neuritis, more marked on the right side. At rest, there was slight ptosis on the right side, and also weakness of the right internal rectus. No nystagmus. The pupillary reactions were fairly normal. The fifth nerve was intact; there was slight facial palsy on the left side when crying. Hearing was normal. The speech was drawling in character; swallowing normal.

The left upper extremity showed no atrophy nor hypertrophy, but marked hypotonicity and slightly decreased muscular power. The reflexes were present. There was marked incoördination, often resembling a very coarse intention tremor. There was marked adiadochokinesis; the stereognostic sense was intact; there was some dissociation of motion and position and also temperature sense; there was general hyperesthesia, apparently emotional, with contradictory replies and lack of proper coöperation. The right upper extremity showed a slight incoördination on volition. The abdominal and epigastric reflexes were present, with marked asynergia of the trunk.

The left lower extremity presented a similar picture to the upper, but more pronounced. There was hypotonicity and decreased muscular power. The patellar and Achilles reflexes were present, but not exaggerated: no Babinski nor other extensor responses. On a few occasions, a double exhaustible ankle clonus was obtained. There was marked impairment of synergistic sense, as well as definite ataxia, not increased on closure of the eyes. The superficial reflexes and sensory symptoms were similar to those in the upper extremity, occasionally dissociated, but contradictory.

The authors stated it was evident from the symptomatology present in

this case that one of the factors they were dealing with was that of increased intracranial pressure, as shown by double optic neuritis, headache and vertigo, and, more recently, somnolence. Syphilis was ruled out by negative blood and spinal fluid examinations and by the family history. There then remained the possibility of neoplasm, cysts or internal hydrocephalus.

If one assumed that one were dealing with a neoplasm, which was quite likely, because the process had been a slowly progressive one, the problem of localization in this case became a rather difficult and uncertain one. There was a good deal of evidence suggestive of chronic cerebellar disease, as shown by the vertigo, the markedly ataxic gait, asynergia on voluntary movement and mild hemiparesis, together with a definite adiadochokinesis and unaltered plantar and inconstant deep reflexes. There was, however, no nystagmus.

As to cerebello-pontine angle involvement, there was of course a mild facial palsy, but no disturbance of hearing, and it seemed rather unlikely that an extracerebellar lesion in this region, which was usually of auditory nerve origin, should not produce some disturbance of hearing.

In view of the very early appearance of Jacksonian convulsions—two weeks following the initial hemiplegia—it was difficult to rule out a motor cortex disturbance, and with the few definite localizing signs, it was suggestive of a supratentorial process, probably subcortical. It was therefore quite likely that a progressive lesion in the post-frontal region would cause contiguous pressure phenomena, and in addition interfere with the fronto-cerebellar tracts, giving the signs simulating cerebellar disease. The optic neuritis, generally late in onset, would fit in here.

The convulsions might be explained by a lesion in the vermis, which usually gave rise to so-called cerebellar fits, and therefore completed the picture of a distinct cerebellar affair. Similarly, the post-parietal area so intimately associated with cerebellar functions might easily account for nearby pressure signs, but the usual sensory disturbances were lacking: also the stereognostic and visual functions were intact.

The child had often displayed choreo-athetoid movements on the affected side, increased on exertion: this, with her increased emotional reaction to external stimuli, would suggest a thalamic lesion, but the sensory symptoms, especially the subjective paroxysmal pains, heat and cold, and the hemianesthesia were absent. If only the posterior end of the thalamus be involved, superior cerebellar peduncle disturbance would answer well.

As to the nature of the lesion, if we realized that the disease was probably of three and a half years' duration in a child seven and a half years old, it was difficult to ascribe it to the characteristic ones, namely, sarcoma, glioma, tuberculosis, cyst, etc. The optic neuritis was apparently of recent onset, because the vision was fairly intact. Tuberculoma was rendered improbable by the absence of signs elsewhere, while sarcoma or glioma should have done more damage by this time unless there be a recession, with cyst formation. Internal hydrocephalus could be fairly ruled out by the absence of sufficient mental impairment, lack of motor tract disturbance and gross appearance of the head. The most likely lesion would be the relatively benign endothelioma.

Dr. Leszynsky said the history of the case seemed to indicate an encephalitic process to begin with. What the condition was now he did not know, but the symptoms pointed to a cerebellar lesion.

Dr. Tilney said that from the confusing symptoms, it was difficult to decide upon any particular localization. Still, the ataxia pointed quite definitely to a cerebellar lesion, and as we knew that that part of the brain is so frequently affected in children, he would be inclined to ascribe the symptoms to a lesion involving the dentate nucleus on the left side.

Dr. S. P. Goodhart said that in the absence of nystagmus, he was not inclined to accept the assumption of Dr. Tilney, and he thought that a post-frontal right-sided lesion could not be positively ruled out. In a hypophysial tumor it was not uncommon to find the field of vision unaffected.

Dr. Rosenbluth, who had previously seen this patient at the Beth Israel Hospital, said that while the history he obtained from the mother at that time was not very clear, it pointed to a meningitis in infancy, and the convulsions seemed to be post-encephalitic, apparently of the motor cortex type. The eyes at that time gave negative findings. He regarded the case as one of left cerebral hemiplegia, with post-frontal sensory disturbances.

Dr. Terriberry thought the symptoms pointed to a preceding inflammatory process, and gradually progressing from an irritative into a compressive condition. The symptoms seem to indicate that the trouble, at present, is confined to the sensory apparatus. It is impossible to trace these symptoms to a small focus. We probably have to deal here with what was at first a rather widely distributed irritation which had now become restricted to a basal region fairly well forward. He was not inclined to believe that we had to deal with a neoplasm. Possibly there was an internal hydrocephalus as a part of the picture.

Dr. Leszynsky thought the authors had scarcely been justified in ruling out an internal hydrocephalus, while a subtentorial process, which they favored, would probably have given rise to more pronounced papillitis. In all probability, the speaker said, the child had an encephalitic process which produced the original symptoms, namely, the convulsions and subsequent paralysis.

Dr. Skversky said he did not think the fever bore any relation to the disease process.

A CASE FOR DIAGNOSIS [SPECIFIC LESION INVOLVING THE THALAMUS?]

By Smith Ely Jelliffe, M.D.

The patient was a married woman, 32 years old, the mother of three children, aged, respectively, nine, seven and two and a half years. The patient's history dated back to March, 1913, when she began to suffer from pain in the left side of the body and the left arm and hand, with numbness, and pain in the neck on the same side. These pains were rather severe, and of a sharp, shooting character, and have been more or less constant from that time on. Following this, there was a slowly progressive numbness and tingling, with a sense of insecurity on the left side of the body and face, and she noticed that she began to drop objects that she held in her left hand. There was also a slight irregular tremor of the left hand when she began to use it.

Examination showed a definite impairment of epicritic sensibility in

the hands and feet and a loss of stereognostic sense. The reflexes were increased on both sides, but not more marked on one side than the other. There was no Babinski; no ankle clonus. There was a definite loss of ability to pronate and supinate the left side without impairment of muscular power (adiadochokinesia). There was no interlacing of the color fields, but the eye-charts indicated the onset of a gradual bitemporal field contraction for all colors, premonitory to a bitemporal hemianopsia. The Wassermann was originally negative, but under a provocative neosalvarsan injection it became double plus; subsequently it again was negative. The x-ray showed no changes in the sella turcica. The patient complained of a crackling noise in the left ear.

During the earlier stage of this patient's illness, Dr. Jelliffe said, there had been a great deal of emotional hyperactivity with great asthenia which had led to a previous diagnosis of hysteria.

Dr. Louis Casamajor said the sensory and motor symptoms in this case led him to think of a thalamic lesion. He could recall instances where for a long time such a lesion gave rise to symptoms which were regarded as functional, before its organic character was recognized. This assumption of a thalamic lesion, however, was not in accord with a bitemporal hemianopsia, as it was difficult to conceive how a single lesion could reach from the posterior part of the chiasm upwards and not involve the pyramidal tracts.

Dr. Terriberry said the eye chart shown by Dr. Jelliffe did not indicate a bitemporal hemianopsia; it only showed a concentric contraction of the visual fields. The symptoms in this case reminded him of one that recently came under his observation in which he made a diagnosis of hysteria, which subsequent events proved to be correct.

Dr. Tilney said that with the bitemporal hemianopsia eliminated, he thought the symptoms pointed to a thalamic lesion.

Dr. Walter Timme thought the symptoms indicated a thalamic lesion. It had lately been reported that the subthalamic lesions had some effect on bladder control, and this fact would suffice to bring the lesion producing the syndrome shown by the patient in the hypothalamus.

Dr. Rosenbluth suggested a multiple sclerosis with unusual symptoms, most likely a luetic process. In such a case we might have to deal with a thalamic lesion, as cases he had seen with multiple sclerosis symptoms with sudden onset, had shown thalamic lesions postmortem.

Dr. Goodhart thought the indications were in favor of a vascular lesion of specific origin.

Dr. Jelliffe said the suggestion made by Dr. Rosenbluth was interesting in view of the fact that the Wassermann test was positive in some cases of multiple sclerosis.

Personally, the speaker said, he had no doubt that we were dealing here with an organic lesion. These thalamic cases were not infrequently looked upon as functional because of the fact that the symptoms were purely sensory. We had here a beginning thalamic syndrome which was practically never found in hysterical states. This patient further had a sinus disturbance on the right side which rhinologists had diagnosed as specific or tuberculous.

Dr. Frederick Tilney of Brooklyn read a paper on " New Clinical Instruments for Measuring Muscle Strength and Tendon Reflex Threshold," with lantern-slide illustrations, and showed two new clinical instruments of precision for measuring muscle strength and tendon reflex threshold.

Dr. Louis Casamajor said the devising of these instruments of precision by Dr. Tilney was a step in the direction of placing neurology on a more exact scientific plane. The dynamometer he had found of extreme value in testing the strength of certain groups of muscles, particularly in cases of anterior poliomyelitis and in watching the return of the muscle function in traumatic brachial palsy. With this instrument we could detect the earliest return of function and could base our prognosis upon exact scientific measurement rather than upon pure guesswork. He had also found it of value in drop foot and other conditions and it had made a strong impression upon him as being something more accurate than anything of the kind we have had before.

Dr. Timme said the stereopticon pictures of the tendon reflexes shown by Dr. Tilney were an excellent illustration of the accuracy of this instrument, as compared with the older methods. Instead of adding to the history of our case that the "reflex was still deficient" or an equally unsatisfactory expression, we had here an instrument which gave us in exact terms the amount of improvement or otherwise that had taken place.

WILSON'S LENTICULAR DEGENERATION

By Charles E. Nammack, M.D.

A boy, 20 years old, was admitted to Bellevue Hospital on June 20, 1914. He had never had any regular occupation. His father died at the age of 42 of glandular tuberculosis; his mothre at about the same age of pulmonary tuberculosis. His parents were not consanguineously related. The mother had seven children, the patient being the last child. Of the seven children, four were living and in good health. One brother died of pulmonary tuberculosis. The patient stated that so far as he knew, no one in either branch of the family had a condition similar to his. The family history was negative as to gout, rheumatism, syphilis, alcoholism or nervous affections. One of his brothers was married and had one child, in good health. There was also a married sister with two children in fair health.

This patient attended school until he was unable to stay in the class. He smoked cigarettes and occasionally drank a glass of beer. He had the usual diseases of childhood and at the age of five years he lost his speech and the power of walking, being obliged to creep around, but he was able to go to school at the age of ten, and left six years later, in 4-a grade. He states that he was always near the head of his class and liked to study. He had a bad temper and would get into quarrels with the other boys. He left school at the age of 16 because his left arm began to shake so that he could not hold objects in it. After he left school he remained at home, occasionally going out with draymen, etc., but he had never had any regular work.

The first symptom of the disease occurred when he was six years old, when it was noticed that his left hand trembled considerably and that his right leg slowly turned in, as the patient expressed it. The foot finally got into such a condition that he walked on the side of the foot and had to catch hold of bed-posts, etc., to support himself. He was taken to the family physician, who said that he had St. Vitus' dance. There was no history of epileptic fits or periods of unconsciousness. Gradually, the

tremor of the hand became more aggravated, the condition of the foot became worse, and his speech became so nasal in quality that it was difficult to understand him. When he started to do anything he had to wait a few minutes and then quickly arose; as soon as he got up he would

Fig. 1. Case of Lenticular Degeneration.

start swaying around and would have to take hold of some support to pull himself along. If he was in the open, without support, he would throw himself forward and drag or slide his feet. After he started walking he got along very well unless he stopped; states he could walk across the Brooklyn bridge providing he did not stop, but kept right on. The muscles of the arm and trunk were remarkably well developed.

The patient's facial expression was fixed; the mouth was large and drawn, and when walking or doing any form of exercise he protruded his tongue. He understood everything that was said to him and was usually in a jolly mood, although he had a bad temper. His intelligence was about on a par with that of a boy of twelve or thirteen. He was able to
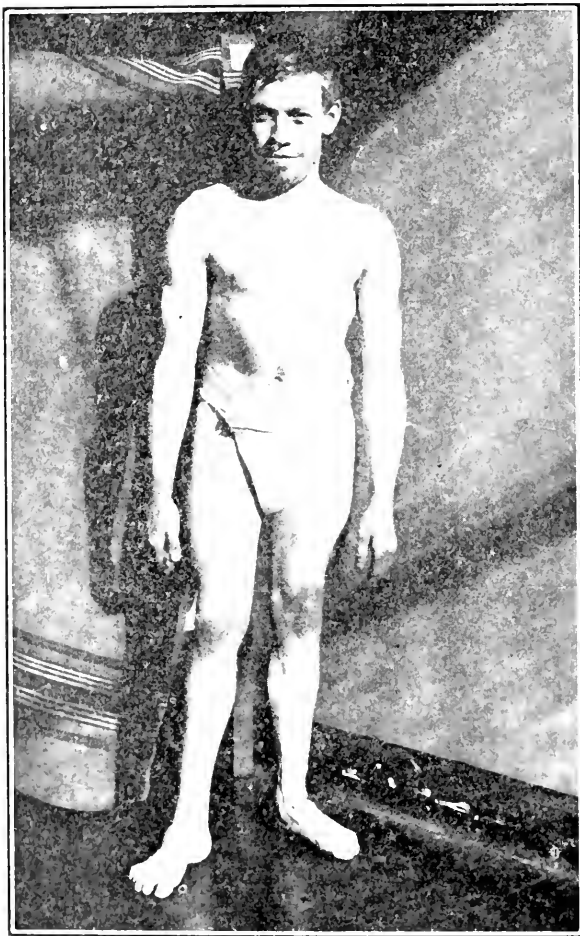

FIG. 2.   Case of Lenticular Degeneration.

dress and feed himself; only it took him longer. His condition had apparently remained unchanged for several months; at least, it did not appear to differ physically or intellectually since the date of his admission on June 20, 1914.

The patient was well developed and nourished. His movements were

jerky; that is, his head and arms would jerk while his spine became rigid with a functional anterior curvature, with talipes equinovarus of the left side. As he bent forward, the right foot was thrown out in an inverted position, and the left foot was drawn by sliding, in the meantime the head, arms and pelvis going through jerky motions. The speech was long and drawling, making it difficult to understand him. Swallowing was normal. The tremor of the hand was coarse. The grip was good; the knee and ankle jerks were exaggerated; sensations appeared to be normal. The Wassermann test was negative. There was atrophy of the muscules of the right leg, hip and calf, with compensatory hypertrophy of the other muscles of the body.

Dr. Nammack said that when this boy was about ten years old he was treated at the Cornell Dispensary, without diagnosis. About two years later he was under treatment at the Vanderbilt Clinic; diagnosis withheld. When he was admitted to Bellevue Hospital in June, 1914, the case was regarded as a puzzle until Dr. Foster Kennedy called attention to Wilson's article on lenticular degeneration, when it was placed in that category. So far as he was aware, Dr. Nammack said, this was the first case of Wilson's lenticular degeneration to be shown in this city. One case had been reported in Philadelphia

Dr. Foster Kennedy said that while he was inclined to regard this case as an example of Wilson's lenticular degeneration, he recognized the fact that there was considerable scope for argument in the diagnosis. In several important respects, this case did not absolutely conform with the clinical description given by Wilson in his paper. One was the comparatively slow progress of the disease in this case—its long duration. Then again, there was the lack of emaciation and pyrexia and the absence of any evidence of liver disease. Of course, it was fair to presume that the lenticular nucleus could be diseased without visceral involvement and give rise to a syndrome somewhat dissimilar from that described by Wilson, but as the case stood now, it did not conform in the above particulars with the original description of Wilson's disease, which was regarded by him as a clinical entity, dependent on toxic causes, and the main feature of which was involvement of the liver associated with degeneration of the lenticular nucleus. It was unfortunate that the name adopted by Wilson, *i. e.,* progressive lenticular degeneration, did not suggest the presence of concomitant liver disease. Whether or not the liver was cirrhosed in the case shown by Dr. Nammack could not be definitely stated at this stage. In only one of Wilson's cases was there jaundice.

Dr. J. Ramsay Hunt said that he had become very chary in making the diagnosis of Wilson's disease, since an experience with a case which had been under observation for a number of years at the Montefiore Home in which the clinical picture was in many respects typical of this condition. The progressive rigidity and the terminal symptoms corresponded in almost every particular with Wilson's description of lenticular degeneration. At the autopsy, however, the liver was found to be perfectly normal and careful serial sections of the lenticular nucleus showed no macroscopic lesions. Some histological studies were now being made in this case which were not yet complete.

The clinical picture of Wilson's disease, therefore, may be very closely stimulated by a clinical type which is probably a juvenile paralysis agitans.

In the case presented by Dr. Nammack, the symptoms which are now of 14 years' duration, seemed to have been consecutive to an acute

central affection of early childhood. It is not unlikely that the entire clinical picture is simply the result of a polioencephalitic process in early life, and not a progressive degenerative condition.

Dr. Smith Ely Jelliffe said that the bilateral character of lenticular degeneration as originally described by Dr. Wilson assumed importance. This patient did not show a bilateral tremor. The patient had athetoid movements of the left upper extremity, and pulsy and spasm of the right leg, and the speaker said he was inclined to agree with Dr. Hunt that we had here the results of a polioencephalitis occurring in youth, with athetosis on one side and spasm on the opposite side. In the cases described by Wilson the tremor was invariably bilateral. In some of the patients which were presented at meetings of this Society by Dr. Jelliffe as probable cases of multiple sclerosis with paralysis agitans like syndromes, the possibility of Wilson's degeneration was considered and the relationships to this disease taken up. He thought that the diagnosis of lenticular degeneration could not be successfully maintained in this case on account of the absence of any hepatic involvement, the long duration of the disease, the non-bilaterality of the symptoms, and the doubtful clinical findings.

Dr. Nammack, in closing, said the possibility of an old cerebral hemorrhage, with post-hemiplegic athetosis, was considered in connection with this case, but subsequently rejected. The patient's symptoms had not been noticeably progressive since his admission to the hospital four months ago.

As regarded the long duration of the disease in this case, and its bearing upon the possible diagnosis of Wilson's disease, Dr. Nammack said there was considerable difference of opinion among those who had reported cases of lenticular degeneration since Wilson's original description. Wilson divided his cases into two groups, *i. e.*, acute and chronic, the duration of the latter averaging four years. Sawyer's case lasted seventeen years, but when Wilson saw this case he threw it out. None of the cases reported in this country entirely agreed with Wilson's description. While this case was somewhat analogous to the juvenile type of paralysis agitans, there was enough difference to separate them clinically.

THE TREATMENT OF SYPHILIS OF THE NERVOUS SYSTEM WITH SALVARSAN IN THE FRANKFURT AND HAMBURG CLINICS

By F. J. Conzelmann, M.D.

Dr. Conzelmann described in detail the methods employed in the treatment of syphilis of the nervous system with salvarsan in the two representative clinics in Germany—the Dreyfus clinic at Frankfurt and the Nonne's clinic at Hamburg.

At the Dreyfus clinic the first idea of salvarsan was conceived, and here the great master Ehrlich visited the clinic, rendered individual supervision and offered suggestions. One was impressed with the well-planned and orderly arrangement of the clinic, and the feature that stood out most prominently was that Dreyfus did not treat the patients as merely cases, but as individuals. He first selected the type of the disease; secondly, he gave the intensive treatment of salvarsan and mercury;

thirdly, he adapted the dose of salvarsan or mercury to the individual and was guided by the constitutional reaction; and, fourthly, the treatment was continuous, with definite periods of intermission.

Ehrlich and Dreyfus preferred old salvarsan to neo-salvarsan, and used the latter only on certain indications, especially when a mild, non-irritating action was desired; nevertheless, the initial treatment was frequently begun with neo-salvarsan. The concentrated solution of salvarsan was always used, and was prepared as follows: The dose of old or neo-salvarsan was dissolved in 35 c.c. of double distilled water; then the sterile sodium hydroxide was added and the solution injected with the syringe directly into the vein.

A searching physical examination of the patient preceded every course of treatment with salvarsan; in fact, it determined the final treatment. Patients suffering from syphilitic affections of the nervous system soon after the primary infection were as a rule strong, robust individuals, and could tolerate a much larger dose than those in whom the infection had been present for many years. If the patient suffered from gastric trouble, a thorough stomach analysis was made and the condition treated before giving salvarsan. In patients over 60 years of age, salvarsan was given with a great deal of care. In cases with tuberculosis, chronic heart disease or nephritis, the pros and cons were carefully considered.

A course of treatment lasted six or eight weeks, during which time the patient received from three to six grams of old salvarsan, or from four and a half to nine grams of neo-salvarsan, with from six to twelve mercurial injections of 0.02 to 0.05 of a 40 per cent. calomel solution, or the same dose of some especially prepared oily solution of mercury. Patients, after receiving a dose of salvarsan intravenously, were kept in bed for twenty-four hours; if, at the end of that time, there was no feeling of illness nor rise of temperature, they were permitted to get up. Two examinations of the urine weekly were considered imperative.

After the physical examination of the patient, which included lumbar puncture and a Wassermann test of the blood and spinal fluid, had been completed, the diagnosis of the stage of the disease was agreed upon, and a carefully planned, systematic course of treatment was begun. The approximate outline of such a course of treatment in early brain syphilis was as follows: A course of mercurial treatment consisting of five injections of 0.02 to 0.05 c.c. of a 40 per cent. calomel solution every third day. If, at the end of this time, the patient showed no febrile reaction to the injections of mercury, the injections of salvarsan were begun. The mercury injections were continued every third day, and a concentrated solution of 0.15 grams of neo-salvarsan was injected directly into the vein with a syringe. If this dose produced no reaction, the patient received a second dose of 0.3 gram on the following day; no untoward symptoms developing, he received 0.45 the third day and 0.6 on the fifth day. This was continued every other day until the patient had received from one and a half to two grams of neo-salvarsan. Dreyfus began the treatment with old salvarsan, generally starting with a small dose of 0.1 and never going beyond 0.4. The dose was repeated every second day. If at any time during the treatment the patient had a febrile reaction after the injection, the treatment was discontinued and not resumed until the patient was free from fever for at least two days.

A favorable prognosis was given in early brain syphilis—in fact, a positive cure was promised—to all who returned for reëxamination and

took the treatment if the physician advised it and considered it imperative. In the majority of cases of late syphilis of the cerebrospinal system the prognosis in the Dreyfus clinic was generally favorable for improvement, but not for cure. In tabes the patients were treated with salvarsan alone for three weeks, giving one injection of salvarsan of 0.1 to 0.2 gram every other day. At the end of that time the treatment was combined with mercury. As a rule, Dreyfus preferred mercurial inunctions in cases of tabes, but often used the mercurial salicylate. With this form of treatment the patients improved rapidly, gastric and lancinating pains disappeared and the ataxia and visceral symptoms improved. Tabetic cases were always emphatically advised to take a course of treatment every three months until four courses were taken.

In the intraspinous administration of salvarsan, Dreyfus used Gennerich's modification of the Swift-Ellis method. He dissolved 0.15 gram of neo-salvarsan in 300 c.c. of sterile salt solution, and of this solution 5 c.c. were injected intraspinously after the withdrawal of an equal quantity of spinal fluid. His results in initial lues cerebri were very encouraging, while in tabes the results of the intraspinous method of treatment were symptomatic but nevertheless very striking. Dreyfus had no cases of general paresis in his ward.

Since February, 1914, Dreyfus had used two new preparations of salvarsan from Ehrlich's laboratory: the one was copper salvarsan; the other sodium salvarsan. Both could readily be dissolved in water and did not entail the manipulation required in the preparation of old salvarsan. The solutions were given in concentrated form directly into the vein with the syringe. With this mode of administration three or four cases could easily be treated in the course of half an hour.

In Nonne's clinic at Hamburg, every patient suffering from syphilitic or meta-syphilitic disease of the nervous system received a course of mercurial inunctions, irrespective of the stage of the disease. For purpose of treatment, Nonne had his tabes cases divided into groups: one group received mercury inunctions; another group mercury inunctions and intravenous injections of salvarsan, a third group mercury inunctions plus intaspinous injections of salvarsan and a fourth group received no treatment whatsoever. In cases of general paralysis he used the mercurial inunctions and intraspinous injections of salvarsan; in cases of cerebral lues he preferred to give mercurial inunctions, with intravenous injections of salvarsan. He employed von Schubert's modification of the Swift-Ellis method. In his tabes cases Nonne got improvement, symptomatically, by the intraspinous method, but in some cases the bladder symptoms were very much worse after the treatment. In two cases the gastric crises returned after a month. He also claimed symptomatic improvement in his cases of general paralysis.

In concluding his paper, Dr. Conzelmann said there was no doubt that no effort was spared in the laboratories and clinics in Germany to develop the science of saving human life. He was still in Nonne's clinic when war was declared, and before he left it appeared as if they had not neglected to develop the science of destroying human life, but on this he would not venture an opinion. He was much in the condition of a depressed maniac who could form no judgment, come to no conclusion and reach no decision.

Dr. J. F. Terriberry said he had under his observation at the present time a man about 30 with tabes who was so much disturbed by the old-

time anti-syphilitic treatment that all treatment was discontinued. Under this let-alone method he had remained comparatively free from symptoms during the past year, and excepting for a slight difficulty in locomotion he seemed to be in perfect health. We must not underestimate nature's restorative powers under good hygienic and dietetic conditions.

Dr. Conzelmann, in reply to a question, said that so many of Nonne's cases of tabes got along well without any treatment aside from rest in bed that Nonne was rather skeptical in regard to the value of the intra-spinous injections in cases of tabes.

Translations

VAGOTONIA

A Clinical Study

By Privatdozent Dr. Hans Eppinger and Dr. Leo Hess

of vienna

Translated by Walter Max Kraus, A.B., M.D., and Smith
Ely Jelliffe, M.D. Ph.D.

Let us take spastic constipation as an example. This may be
associated with symptoms, which are limited to the pelvic nerve
alone. One often hears that these costive patients have erections,
spermatorrhea, or pain in the sphincters, associated with the at-
tempt to defecate. Could we not suppose that the entire pelvic
nerve is hyperirritable under these circumstances, and that it is
stimulated by the act of defecation, so that, by an overflow of
energy, the branches other than those suppplying the rectum, are
involved. Furthermore, we have seen a group of cases in which
epiphora, salivation and conjunctival asthma, as Rosenbach has
described it, were associated, while in organs supplied by other
branches of the autonomic no signs of stimulation could be found.
In such cases we suppose that certain poisons, circulating in the
body have the same partial action as has been found to be the
case with some drugs.

Let us sum up in a few sentences what has been said in the
last two chapters: (1) Vagotonia is a functional increase of tone
in the autonomic system. (2) This increase may affect nearly all
or but a few of the branches. (3) The origin lies in a latent in-
crease of function and this permits stimuli to act more readily
than on a nervous system in which no such increase exists. (4)
Vagotonics, therefore, are more responsive than individuals hav-
ing a normal vegetative system.

8. Combination of Vagotonia with Other Diseases

In the foregoing chapters we have attempted to show that many people have a constitutional condition which makes a visceral nerve—by this is to be understood the entire autonomic or extended vagus, more irritable than its antagonist, the sympathetic. When we consider that these two nerve plexuses control all visceral organs, we cannot fail to realize that a disturbance of one of them will produce anomalous conditions in many organs. On the one hand this constitutional condition may be regarded as stationary and as of long duration,—on the other hand, there are periods in which the condition will be exaggerated and more susceptible to irritation. This fact may well be correlated with the occurrence of various diseases at certain periods of life. We recognize various periods, which dispose to certain diseases, as old age, youth, climacterium, puberty, and menstruation, and we know that during these periods, certain groups of symptoms take the foreground. It seems worthy of question whether or not the constitutional state, which we have described does not also influence certain diseases in a similar way. We have been able to show that spastic states in a limited part of the autonomic system occur in individuals having precisely this constitutional condition. Our attempt to draw other pathological conditions into correlation with the constitutional state we have described must not overshadow the fact that we do not intend to divide all individuals into two classes: the vagotonic and the sympathicotonic, but shall base whatever conclusions we may reach, on cases in which there have been well-defined functional disturbances in two or three parts of the autonomic nervous system. Furthermore, the cases must have shown these disturbances not only before, but also after the disease. We hope to be able to show in what follows that those characteristics of a particular course of a disease, which heretofore have been ascribed to individual idiosyncrasy, are in reality due to a lack or excess of a definite nervous disposition of the organism

Pain is the simplest example of the rôle which nervous components of a syndrome play in its symptomatology. In the same syndrome various individuals may have the intensity of a certain pain vary to a great degree. Certain individuals are not susceptible to the action of cocaine, and the admission that it has not

acted in the right place must be made. Analogously we must admit that poisons produced by certain diseases do not always act on the same parts of the body in each case. For this reason, certain very definite, well known symptoms often are in the background, while others are so conspicuous that the classical picture of the disease is entirely effaced.

For example, should a vagotonic get a gastric ulcer of organic origin, one can readily see that the stimuli from the lesion will pass along the more readily irritable vagus. Thus we shall find in vagotonics with gastric ulcer, a hyperacidity and both increased tone and peristalsis of the stomach, combined with the symptoms they produce. Furthermore cases of gastric ulcer will show signs of autonomic irritation in other parts than those directly affected. Thus we find bradycardia[26] as well as the cardinal symptoms of ulcer, hyperacidity, and great pain combined with retching and a tendency to spastic constipation. The symptoms may vary according to the locality of the ulcer. In some cases of ulcer one finds signs of hour-glass stomach. At operation or at autopsy this diagnosis is not confirmed.

When it is considered that X-ray signs of hour-glass stomach are found in simple vagotonics, there is no cause for wonder that when an ulcer exists, this can also occur, and that these signs of hour-glass stomach are due to an increased tone of the gastric musculature. This in turn is made clearer upon the basis of an increased tone in the autonomic system. On the other hand, it is known that there are cases of gastric ulcer in which no signs of gastric hyperacidity occur, and which are unaccompanied by pain, the only clue to their existence being the presence of occult blood in the stools. Some are found only at autopsy. It seems very significant that signs of general vagotonia are never found in such cases. Cases of gastric ulcer have been seen in which the hydrochloric acid value was not at all increased. These constituted the most difficult group to diagnose from carcinoma, an observation of the greatest interest, since these are cases which tend to develop true neoplasms—callous ulcers. When these facts are considered the question arises whether the various clinical courses of such diseases as Cholangitis, Cholelithiasis and Nephrolithiasis are not in some way related to constitutional variations.

[26] Neusser, Ausgewählte Kapitel der klinischen Symptomatologie und Diagnostic, 1 H. 1904.

Certain cases of gall-stone disease particularly show symptoms which are due to autonomic stimulation. Since this exists not only before but also after the attack, the assumption of a latent constitutional disorder, which alters the course of disease, is well founded. Cholecystitis is often associated with hyperacidity. The vomiting and diarrhea may be referred to the attack, but all of these also presupposes a certain predisposing irritability of the organs involved. We believe that the spastic state, which begins in the gall-bladder and spreads thence to neighboring organs, causing vomiting or diarrhea, may also pass over into the gall passages. Only in this way is it possible to account for the transitory jaundice which occurs in cases of acute cholecystitis, in which there is no reason to believe that a stone is present to cause the jaundice mechanically. That the stone should be forced by the colic into the ductus choledochus and should then fall back after the colic is over, seems very improbable. Finally we wish to call attention to the inconstancy of the relation between bradycardia and jaundice in these cases and to the additional fact that the bradycardia may not exist in old people. In the young as well great variations may be observed, so that here, too, we must assume some predisposition of the cardiac vagus. If on the one hand, gastric ulcer and some cases of gall stone colic are related to autonomic irritation, it would seem on the other hand that the diminished gastric acidity and mobility, and the dry skin and mucous membranes of carcinoma signified a diminution in the activity of the autonomic. In this connection it seems significant that we found that adrenalin glycosuria was almost never absent in the more severe types of general carcinomatosis, while pilocarpin never gave strong reactions. Thus the question is raised whether perhaps the nervous constitution does not play a rôle in the occurrence of tumors. The question also arises,—does the constituional state of the individual cause a definite course in such autonomic diseases of the nervous system as tabes dorsalis.[27]

It is well known that there is a group of cases of this disease which begin with visceral disturbances, crises, as the most prominent symptoms, nor is it infrequent to find cases in which these crises are entirely lacking. It is not difficult to show that the crises themselves are signs of autonomic irritation. The narrowing of the pupil at the onset of the attack, the subsequent gastric

[27] Eppinger and Hess, Wiener klin. Rundschau, 1909, No. 47.

hypersecretion,—sometimes associated with hyperacidity, the increased peristalsis and sweating, which may occur alone or at the height of some other crises, the epiphora, laryngeal and rectal crises, all show that at the height of the attack the autonomic is in a state of irritation. The fact that the spastic states are replaced in the later stages of the disease by their opposites (paralysis of the recurrent laryngeal, marked gastric and intestinal atony, anacidity, and even incontinence of feces and urine impotence, etc.) leads us to believe that what were originally irritative states of the autonomic have been replaced by paralysis of those centers which originally caused the irritation. A proof of this for us is in the discovery that in many severe cases of tabes, degenerations were found in the trunk and nucleus of the vagus. It may be permitted us on these grounds to assume that the toxic agent of tabes dorsalis, in addition to attacking the posterior spinal cord columns, has also a specific affinity for the autonomic system, since it first irritates and then paralyzes it. It is difficult to say whether or not the crises, regarded as spastic states, are merely states of irritation superimposed upon vagotonia. It is, however, striking that cases without crises, do not show signs of general vagotonia. A further argument in favor of our hypothesis is that those signs which are so often found associated with vagotonia, as for example, status thymicus and lymphatism, were never found in cases of tabes without crises, since according to Edinger's theory of the consumption of neurotropic poisons, they first affect those nerves which are functionally most active, we might, by analogy, consider the possibility that the already over-irritable autonomic system would be most prone to take up the toxic agents of tabes dorsalis.

The following case may be taken as an example of the predisposing affect, which pre-existing vagotonia has upon the occurrence of crises in tabes:

A. F., a merchant, has complained since his youth of nervous stomach trouble. He took soda for its relief. Fifteen years ago a gastric analysis was done and showed hyperacidity. He has been costive for many years, going to stool but every three to four days. The stool is very small in size, and often mixed with mucus. He has a tendency to salivate and sweat at the same time. Ten years ago the patient was infected with syphilis. This was followed by a course of mercurial inunctions. The first signs of gastric crises occurred over three years ago. Three years ago the symptoms increased so that he had continuous vomiting and marked gastric pains for two to three days of

each week. Even when he had not taken food, the patient vomited large amounts of an acid, bile-stained fluid. As the increase in frequency of these attacks continued, the patient came to the clinic for advice. Objectively here were absence of the light-reflex, permanent absence of the knee-jerks, and a moderate anesthesia in the region of the right nipple. The "Head zone," corresponding to the stomach, showed marked hyperalgesia. During the crises, the blood pressure fell from the normal 105 mm. Hg. to 70 and even 60.

Basedow's disease is another example of the significance of vagotonia in understanding pathological conditions. It will be very difficult to account for all the symptoms of this disease on the basis of one cause, if one takes the point of view that they are referable to nerve irritation. Symptoms which are referable to sympathetic stimulation are found associated with others undoubtedly referable to autonomic stimulation. The cardinal symptoms themselves, exophthalmos and tachycardia on one hand, sweating and diarrhea on the other, indicate stimulation of both parts of the vegetative nervous system. In another article we have attempted to show that one explanation will not account for all the accessory symptoms, but that in the individual, both autonomic and sympathetic stimulation are combined, even though this may be but a transitory matter. On the other hand, we have found typical cases of Basedow's disease, in which all the symptoms were due to stimulation of one of the two nervous systems. The diagnosis in these cases was made certain by the increase in the level of metabolism shown by a marked degree of emaciation in spite of a sufficient diet. On the basis of these cases, we divided Basedow's disease into a vagotonic and a sympathicotonic type. Characteristic of the first type were: (1) relatively slight increase of the pulse rate, (2) subjective cardiac symptoms, (3) marked v. Gräfe's sign, (4) wide lid-slits, (5) absence of Moebius's sign, (6) very moderate grade of exophthalmos, (7) marked epiphora, (8) excessive sweating, (9) profuse diarrhea, (10) symptoms of gastric hyperacidity, (11) eosinophilia, (12) disturbances in the rhythm and mechanism of respiration, (13) absence of alimentary glycosuria.

In the sympathicotonic cases there were (1) marked exophthalmos, (2) No. v. Gräfe's sign, (3) positive Löwi's phenomenon, (4) marked Moebius's sign, (5) frequently dry eyes, (6) a high degree of tachycardia with no subjective symptoms, (7) no sweating, (8) no diarrhea, (9) marked falling out of the hair, (10) tendency to rises in temperature, (11) no eosinophilia, (12) no

respiratory disturbances. (13) alimentary glycosuria. We were able to establish the antagonism between adrenalin and pilocarpin in these cases. The number of cases in which one or the other system was excessively irritated was, however, very small. Those which were of the sympathetic type showed but little reaction to pilocarpin, while those which were of the vagotonic type showed no glycosuria after adrenalin. These types, which are not always constant, one passing into the other in various phases of the disease, led us to believe that at the root of the matter lay a difference in the make-up or constitution of the individual. By this we mean simply that those who are vagotonic before acquiring the disease, will be mainly of the vagotonic type during it, while those who were previously of the sympathicotonic type will have symptoms corresponding to those produced by sympathetic irritation. Furthermore, should the individual have been neither vagotonic nor sympathicotonic before the onset of the disease, the thyroid secretion, since it affects both symptoms, will cause symptoms of irritation of both.

It is worthy of mention that the one case, which was of the pure sympathetic type showed practically no thymus nor any lymphatic tissue. To this we would add that in another case, which had sympathetic symptoms for a long time, but developed in addition some vagotonic symptoms just prior to death, showed a large thymus and well-developed lymphatic system at autopsy In spite of this, we believe that those who are vagotonics before acquiring a Basedow, will show during the disease the symptoms produced by the action of those components of the thyroid secretion, which acts upon the autonomic nervous system. By this we do not wish to imply a condition of dysthyroidism, but that these individuals do not react to those constituents of the thyroid secretions, which stimulate the sympathetic, just as certain individuals do not react to adrenalin. The fact that both at the height of a severe case of Basedow and during the course of a very mild one there may exist severe symptoms of irritation of both systems may be interpreted as the weak point in our idea of their genesis, since we have advanced the viewpoint that if the vagus is strongly stimulated, it is scarcely possible that there should exist a simultaneous high degree of stimulation of the sympathetic.

Observations upon those afflicted with mental disease have shown that when it is most severe there is a disturbance of the

equilibrium of the vegetative nervous system. Thus we can draw an analogy between Basedow's disease and central nervous system disease and say that where either exists the equilibrium will be disturbed. We observed that in many cases of catatonic or maniacal excitement there occur in quick succession strong glycosuric reactions to adrenalin, followed by marked responses to pilocarpin. We never saw so high a degree of glycosuria as in those having mental disease (early stage of dementia præcox), nor such marked responses to pilocarpin. After the usual dose of pilocarpin (gr. 1/6), some cases had such severe salivation and epiphora, besides a discharge from the nose, that there was almost a continual stream from both nose and mouth. These were the cases which, after the administration of pilocarpin, usually reacted with spermatorrhea, vomiting, severe sweating and urinary urgency.

We often found a reaction of both parts of the vegetative nervous system in diseases of the spinal cord, as multiple sclerosis or transverse myelitis.

The fact that during the psychic disturbances of mental disease over-irritability of both parts of the vegetative nervous system could be demonstrated, permits us to give the same fact more consideration in Basedow's disease.

In looking over our case histories, we found that the group of cases, which showed alternately signs of irritation of the two systems were not complicated by mental disturbances, while those which showed these signs simultaneously often were complicated by psychical disturbances of one sort or another.

In investigating psychoses we found individuals who did not react to the usual dose of sympathicotropic or vagotropic substances. Since these cases were mainly of the depressed type, we feel that our observations are of some significance in the consideration of the pathogenesis of certain psychoses.

The absence of central control may play a part in Basedow cases as well as it does in mental disease with excitement. This point of central control brings us naturally to the idea that under physiological conditions, the central nervous system exerts a definite influence over the antagonistic parts of the vegetative nervous system.

(To be continued)

Periscope

Allgemeine Zeitschrift für Psychiatrie

(Band LXX, Hefts 3 and 4)

1. Privy Councillor Dr. Heinrich Schüle. A Complimentary Notice about Dr. Schüle who has just celebrated the 50th anniversary with the Ilenau Asylum.
2. The Pathological Histology of Korsakow's Psychosis. ERNST THOMAS.
3. Psychoses in Twins. DR. SCHULTES.
4. Contribution to the Diagnostic Application of the Wassermann Reaction in Psychiatry. R. BUNDSCHUH.
5. Psychically Abnormal Tramps. HANS ROEMER.
6. A Contribution to the Psychopathology of Family Murder by the Insane. WALTHER HASSMANN.
7. The History of the Foundling Asylum, Madhouse and Hospital, also of the House of Correction at Pforzheim. W. STEMMER. (Unsuitable for Abstract.)
8. A Contribution to the Understanding of the Animal Mind. LUDWIG WILSER.
9. The Development of the Building of Insane Asylums. MAX FISCHER.
10. The Question as to the Basedow Psychoses. ERNST COLLA.
11. The Forensic Importance of Chorea. DR. HORSTMANN.
12. Lunacy Laws in Servia. W. M. SUBOTIC.
13. The Deaf Mute as a Witness in Court. AUGUST HEGAR.
14. Self Mutilation in General Paresis. H. BRASSERT.
15. Epilepsy and Sedobrol. DR. BÖSS.
16. The Rulers of the Julian-Claudian Imperial House in Historical, Genealogical and Psychiatric Light. ERNST MÜLLER.
17. Admissions to the Curative and Custodial Asylums as well as to the Psychiatric Clinics of the Grand Duchy of Baden, from 1826 to 1910. HERMANN HERR.

    1. Of local interest only.

    2. *Korsakow's Psychosis.*—In volume 67 of his journal the author reported his findings in two cases of Korsakow's psychosis and here adds those in another examined by more specific methods not used in his former cases. The case was that of a man 49 years old whose father was alcoholic and one paternal aunt insane, whose urine had contained some sugar and who, having shown the typical Korsakow's symptom-complex, died of myocardial degeneration. The nerve cells, examined by Nissl's method, showed various degenerative changes. There was degeneration of fibers especially of the tangential layer, the fibrils by Bielschowsky's method showed degeneration and thinning of the fibril network in some places, while the neuroglia by Weigert's method, showed quite general increase in the diseased areas. The sections were taken from the first and second frontal, the anterior central convolutions and the region of the calcarine fissure. The degenerative changes were pretty generally distributed though least marked about the calcarine fissure. The fine vessels of the cortex showed no

changes though the larger ones had their walls somewhat thickened. The author recapitulates as follows: (1) This last investigation confirms in the main the former findings both of the writer and of Vollrath and Meyer. (2) He agrees with Meyer in considering degenerative processes as the characteristic disease process. For this speaks the circumstance that in cases running an acute course the degeneration is much more rapid than in chronic cases. (3) The most marked alterations were found in the anterior central convolution, less change in the first frontal while the occipital region was least affected. (4) In the affected regions the third to the sixth layers were more affected than the first and second layers. The tangential fibers were less affected and there was less proliferation of neuroglia than is usually the case in paresis. (5) In contradistinction to this last disease there is less shrinkage of the cortex in general.

In general it may be said that corresponding to the anatomical findings there is scarcely such profound mental destruction as in general paresis. The investigations of Gregor have shown that in spite of great disturbances of comprehension and memory in Korsakow's patients, they still retain a certain ability to learn, differing in this from paretics. Since in his cases the two outer cortical layers were found least affected he raises the question as to whether the better mentality as compared to paretics is not connected with the preservation of these layers. According to Nissl's investigations the deeper layers are concerned in localization, the more superficial in other functions, presumably in association. This article is illustrated by some good reproductions of photomicrographs.

3. *Psychoses in Twins.*—Mental disease in twins is of particular interest, since here we have two individuals who have been presumably exposed to exactly the same prenatal influences. To the limited number of cases already reported the author is able to add five additional sets of cases from the Ilenau Asylum. As to the clinical form of the psychoses, in observations I and III it was manic depressive insanity. In I both twins were afflicted with typical circular insanity in which manic, melancholic and nearly normal phases alternated. In observation III there was also manic-depressive, but in one case it was complicated by alcoholism. In observation V, in spite of some traits in common, depending probably upon a common constitutional basis there was in one twin manic depressive, in the other hysterical insanity. In observations II and IV dementia præcox was present. In psychoses in twins the factors of heredity and induction come chiefly under consideration. The factor of induction can never be completely excluded. It is favored by growing up together in close intimacy and the action on both individuals of the same external influences about the same time of life. In the first observation the earliest period of excitement coincided with menstruation, which of course does not always coincide exactly in time in two persons. Later in the two sisters the opposite phases of the disease occurred nearly always about the same time, so that induction can be nearly excluded. In observation II psychic infection may well be considered as an exciting cause. In observation III the outbreak of the disease was widely separated in point of time in the two twins. It can be traced in each case to a somatic exciting cause, in one brother to nephritis, in the other to trauma. The pair were separated, each being married and living with his family. In observation IV the close interdependent intimate relation in thought and pursuit makes the influence of the inductive factor seem quite probable. In observation V the twins had lived apart

from earliest childhood and up to the outbreak of the psychoses had had
no close relations. Later, however, worry about the sick sister may have
acted as an exciting cause for the depression of the other sister. In all
the cases there was more or less hereditary predisposition to psychoses, in
fact a converging heredity. As to the other children of the family, in
observation I, only the twin sisters were insane while all the brothers re-
mained healthy. The same thing was the case in observation IV. In ob-
servation II the twins were the only children. In observation III besides
the twin brothers one other brother was insane, while the sister remained
healthy. In observation V besides the twin sisters one other sister was
insane while all the brothers in spite of some peculiarities of character
remained sane and led useful lives. In four of the sets of twins the re-
semblance between the two was striking, both in the mental and in the
physical makeup. In V alone the similarity was less marked. In the like
twins there was a like clinical form of disease, in the dissimilar ones a
different psychosis in each. The like twins can be readily supposed to have
originated from a single ovum with two nuclei, the unlike twins from sep-
arate ova fecundated at the same time.

4. *Diagnostic Application of the Wassermann Reaction in Psychiatry.*
—As method this author finds the original recommendation of Wassermann
most satisfactory, no other antigen working so well as extract of the liver
from a syphilitic fetus, the watery extract being in general preferable to
the alcoholic. In 71 cases of general paresis in which the blood serum and
the spinal fluid were examined, 0.2 c.c. of the latter being used, the result
was uniformly positive and in general equally strong in each. The material
included paretics at all stages. One juvenile case developed upon the basis
of congenital syphilis reacted with equal positiveness. In one case which
had lasted four and a half years the reaction in the fluid was somewhat
weaker than that in the blood, while in another of 16 years duration which
had remained for years in a stationary condition of dementia the reaction
was equally positive in both blood and fluid. In four cases in which there
was marked remission the reaction was inhibited from the start. The
author agrees with Plaut that the Wassermann reaction is always positive
in the earliest stages of paresis and is of the greatest value in its differ-
ential diagnosis. In general he did not find that the Wassermann reaction
was to any noteworthy extent influenced by the treatment of paretics with
nucleinate of sodium, mercury, and salvarsan. Still he would recommend
caution in giving a positive opinion in cases which have had salvarsan treat-
ment, since while he has not found the reaction made negative he has ob-
served that it was decidedly weakened. Nonne's globulin reaction was
positive in all of 54 paretics upon whom it was tried, but he could not find
that its intensity was parallel with that of the Wassermann reaction. Al-
though some doubt has been thrown upon the matter, our author is of the
opinion that by the use of the "Auswertungs" method (*i. e.*, the application
of the Wassermann reaction to fractional portions of the spinal fluid, in
this instance from 0.2 to 1.0 c.c.) we are in a position to differentiate cere-
bro-spinal syphilis, on the one hand, from non-syphilitic psychoses in syphi-
litics, and on the other from general paresis, since he has found that in the
last disease there is without exception a positive reaction to the usual Was-
sermann procedure even when 0.2 c.c. of spinal fluid are used, the cases of
cerebral syphilis failing to react with 0.2 c.c. while they give a positive
reaction when the fluid is raised in amount to 1 c.c. and syphilitics who have

no syphilitic involvement of the central nervous system while showing no reaction from the spinal fluid give a positive one from the blood. As illustration the author gives the histories of 9 cases of cerebral syphilis in which a positive result by the " Auswertungs " method enabled him to make diagnoses from general paresis on the one hand and from non-syphilitic psychoses on the other. Since the Wassermann reaction has become well known among the laity, he has been frequently requested by the relatives of paretics to apply this test to the wives and children of such subjects, and thinks that this has become a social duty of the psychiatric-serologist. Of all wives examined, 6 gave a negative, 5 a positive reaction. He also examined 10 children, some of whom showed some weakness, anemia and slight intellectual and affective disturbances. In all of these, the mothers having given negative reactions, the result of the Wassermann test applied to the blood was negative.

5. *Psychically Abnormal " Tramps."*—A statistical study of the material admitted to the psychiatric clinics in Heidelberg and Freiburg and into the public asylums, Ilenau, Pforzheim, Emmendingen, and Wiesloch, which the author thinks will give a fair representation of the insane among the tramps in the Grand Duchy of Baden. The criterion used in determining that an individual was a tramp was the absence of any fixed place of residence and only persons over 16 years old are included in the statistics. The number of cases considered was 528 (497 men, 31 women). The statistics taken related to sex, age, social condition, religion and occupation, and are exposed in a number of tables. No facts with regard to the forms of mental disease found are given and the author does not discuss any points in the psychology of this class of people.

6. *Family Murder by the Insane.*—The discussion of the case of a woman who while suffering from what the author diagnoses as puerperal melancholia, being left by her nurse for a few moments cut the throat of her six weeks old infant while not molesting the next older child which was in the room with her. He gives her family tree which shows strong hereditary predisposition to insanity. The patient had continually begged to be sent to an asylum as she feared that she would " do something " and was possessed with the fear of injuring her children. The author considers the deed as the result of an insane impulsion arising out of the painful affective condition and not due to disorientation or to delusional ideas, a causation which was long ago recognized by Krafft-Ebing in his " Legal Psychopathology."

8. *Animal Mind.*—An account of the wonderful performances of a two-year-old terrier dog belonging to a lady in Mannheim which the author was able to witness in company with Krall, the owner and teacher of the famous educated horse in Elberfeld. The dog seems to have had a natural talent for reckoning, as his capabilities were discovered by accident while he was present at a lesson in arithmetic being given to the children of the house. His answers, somewhat in the same manner as those of the Elberfeld horses were given by beats with his paw, his mistress having trained him by means of a table in which each letter was represented by a certain number of beats, the most used letters by the smaller numbers, while a few generally used words such as yes (2), no (3), tired (4), etc., were also represented by numbers. His answers as given by the author are truly remarkable. His owner had on the previous day shown him a picture of Mr. Krall and had repeated his name carefully to the animal. She now

asked the dog " Rolf, do you know the gentleman?" A. "Yes." "Do you know his name?" A. "Yes." "Can you spell it?" A. "Yes." "Do so." A. "Krl." "Correct, but what is still wanting?" A. "l." "Certainly, but still something, the most important thing; pay attention, the name Krall" (with emphasis on the a). "Now." A. "a."

The dog was now rewarded with some scraps of meat and after a short rest was asked "How many pieces of meat are there still on the plate?" He answered promptly and correctly "8." He was next shown the picture of one of the Elberfeld horses and asked "Do you know what his name is?" A. "Yes." "What then?" A. "Zarf." "Good, there is wanting only a trifle in his name " "Zariff" (with emphasis upon the second syllable) "what?" A. "i." The dog then played with the children like any other pup. After he was rested he was exercised in picking out some coins, then the maid brought in, folded in two separate packages some numbers and their square and cube roots which she had copied from a table. Mr. Krall picking out two at random and showing them to the dog said " Pick out respectively the square root and the cube root of these numbers." The animal seemed to think for a few moments then selected correctly " $\sqrt{3,969} = 63$ and $\sqrt[3]{110,592} = 48$." (It is not so stated, but presumably he must have been exercised in the sequence of numbers before (Ref.).) After a while his mistress said to him "Listen, the gentleman is a friend of Papa's from Heidelberg and is named Wilser; have you understood?" A. "Yes." "What was the name?" A. "wim." "Hold on! You do not seem to have heard correctly. Shall I repeat the name to you again?" A. "No." "You know it then?" A. "Yes." "Then what is it?" A. "lsr." The animal had not heard the name before. Mr. Krall patted his head and asked " Shall I take any message from you to my pupils Muhamed and Zarif?" A. "Yes." "What then?" A. "Grus" (greeting). The mistress then said "That is enough for to-day. What do you say to the gentlemen who have visited you to-day?" A. "Ad." This was a stray dog picked up on the street about whose antecedents nothing could be learned. If the author is not deceived he certainly is a wonderful animal and bears out his idea that the difference between the human and the animal mind is quantitative rather than qualitative, though the distance between the two is still immense.

9. *The Development of the Building of Insane Asylums.*—A sketch of the development of institutions for the care of the insane in Baden from wards in general hospitals or in poor houses to the projected new Rastatt Asylum which is to care for 2,050 inmates and is to be constructed as follows: 1. Houses for 100–120 patients of two stories and divided into 4 wards with a central portion with rooms for offices, nurses' quarters, etc. These are to be adapted for observation and receiving wards, and for the feeble patients, the criminals, etc. 2. Similar houses but for 50–60 patients only, especially adapted for disturbed patients. 3. Double pavilions of 60–70 beds, containing on the ground floor at each end a day room, in the middle and observation ward for bed patients with 25–30 places, while the rest of the patients are to sleep in a dormitory upstairs. These buildings are intended for the antisocial, some of the disturbed and the partly disturbed who require considerable watching. 4. Simple country houses for 35–40 patients, a day room and perhaps a smaller dormitory on the first floor, the main dormitory upstairs, while the bathrooms, clothes rooms, etc., are in the basement. There is to be a villa for convalescents contain-

ing on each floor 20 beds, also a closed house of about 40 beds for patients of the better classes and an open villa of about 20 beds for the same sort of patients. There is also to be a pavilion of 30 beds for the reception and observation of mentally abnormal children; on the men's side an extra strong building of 50 beds and on each side an isolation house for infectious diseases of 30 beds. This last is to be divided into small departments, and there is provision for the separation of 15 typhoid carriers. The whole institution is to consist of 35 buildings for patients, 17 buildings for offices, shops, etc., and about 24 houses for employees, that is, of 76 buildings large and small. The pavilion system the author thinks is altogether the most desirable form for an asylum yet developed.

10. *Basedow Psychoses.*—The question whether there is any special psychosis in connection with Basedow's disease has been considerably discussed. In the last edition of his text-book Kraepelin has devoted a chapter to the subject, while a number of other authors have made contributions to it. Basedow patients are in general considered as subject to sudden changes in their affective condition, irritability and unrest while euphoria in the main predominates. The author gives here the histories of two men, the first 33 years old who since a head trauma in early life had shown psychic inferiority, restlessness, inability to settle down to any employment, tendency to complain of persecutions on the part of his family, particularly his father, whom he hated, and subject to periods of excitement on account of which he finally had to be committed. His mother had died of tuberculosis and he presented signs of slight involvement of both apices, had a struma, slight tachycardia, tremor and exaggeration of reflexes. Operation upon the thyroid was at first declined, but finally after he had remained over a year without improvement, being subject to exaggerations and remissions in his disturbed condition consent was secured and the left lobe of the thyroid was removed. He made a good recovery from the operation and his mental condition greatly improved, in that he quieted down, could sleep without hypnotics, the extreme lability of affective condition and fallacious perceptions disappeared and he gave on ordinary observation the impression of a fairly self-contained and controlled person, while psychological examination disclosed no marked defect of intelligence. He spoke respectfully of his father but explained that they took too different views of life to agree well. Still he could hardly be considered to-day as an entirely normal person but is still peculiar. While the case agrees in most respects with Kraepelin's description of a Basedow psychosis, there are too many other factors in its etiology for it to be considered as due to this alone.

The second case is that of a man, an artist, at the time of his admission 26 years old, the youngest of 9 children, one uncle insane. He developed mental symptoms when 25 years old, had been in several other institutions before he came under the author's care when 28. He showed alternating periods of excitement and quiet, with from time to time stereotypy, negativism and Ganser's symptom with fallacious perceptions and was on occasion violent and destructive. During his periods of disturbance there was swelling of the thyroid, tremor, tachycardia and exophthalmus, which all decreased as he quieted down. He was always extremely resistive, so that exact examination of him was never possible. The author says that if he had to give a diagnosis he would call the case one of dementia præcox of the hebephrenic form combined with the manic-depressive psychosis. The connection of the Basedow symptoms with his periods of excitement appears unmistakable.

11. *Forensic Importance of Chorea.*—Discussion of the case of a wagon driver who when 48 years old fell from his wagon and sustained an injury to his head, consisting of some deep scalp wounds and followed by symptoms of concussion of the brain, though there was never any evidence of fracture of the skull. From this time a gradual decrease of his mental capacity began to be more and more evident, and two years later he developed involuntary movements of the arms and legs diagnosed by competent observers, the author among others, as chorea. As there was some dispute as to what extent his capacity had become impaired and what compensation should be paid to him, he was repeatedly examined by physicians representing one side and the other who varied in their estimation of his disability and even in the diagnosis, some holding out for athetosis and gross brain injury. In 1911, six years after the accident, the patient's mental condition having further deteriorated, he made an attempt at suicide, inflicting a flesh wound of the abdominal wall upon himself with a knife and drinking 50 grm. of " Russian alcohol " (90 per cent. alcohol with turpentine, 5 per cent. ether, ammonia, and 2 per cent. Spanish pepper). This latter set up a gastritis which greatly reduced his strength and he died two weeks later of thrombosis of the bloodvessels of the lungs. The brain showed no changes beyond a flattening and some narrowing of the convolutions. In the dispute as to whether the accident was a cause of his mental condition, hence of his suicide, the author was called in and gave the opinion that the case was one of chronic progressive chorea, the mental changes being part of the disease, and that the accident could fairly be estimated to have acted as an *exciting* cause.

12. *Lunacy Laws in Servia.*—A résumé of the laws regulating the management of the Servian Curative and Custodial Asylum at Belgrade and the commitment of the insane. If a person is supposed to be insane a member of the family or some official must notify the police, when a physician is sent to examine him and if necessary to have him transferred to the nearest hospital. The hospital authorities must then communicate through police officials with the Minister of the Interior who designates three physicians who examine the patient together, then make out a statement which is handed to the police who then notify the Minister of the Interior. The Minister then decides whether or not the patient needs asylum treatment, and if he does, orders him committed to the first department, *i. e.*, the curative branch of the asylum. If the patient or his friends resist committal they must make a written protest to the Court which must then call upon the police for all the facts in the case, and in case the patient is unable to employ counsel must assign a lawyer to defend him. A time is then set for the hearing and the patient, his friends, such witnesses as are needed and finally the doctors are called to testify. The Court then renders a decision and orders the disposition of the patient. A person can only be declared a lunatic by judgment of the Court. An appeal from the order of the Minister of the Interior can be taken in a similar way and the Minister is then represented before the Court by the District Attorney. The Court can if it thinks necessary designate other physicians to examine and report on the case. After the patient has been in the curative part of the asylum for some time and it is decided that the case is incurable a commission of three physicians must examine him and report to the Court which then declares him insane, and only after this formality can he be transferred to the chronic or custodial department. To discharge a patient

a commission of three doctors must examine him and certify to the Minister of the Interior as to his recovery. His discharge is then ordered. The Director of the Asylum cannot discharge him on his own responsibility. The author, who is the present Director of the Asylum does not regard these laws as very modern or workable.

13. *The Deaf Mute as a Witness in Court.*—A discussion as to the admissibility and reliability of testimony given by deaf mutes à propos the trial of the Director of an institution for patients of this class who was accused of immorality and maltreatment of some of his charges. The mere fact that a person is a deaf mute does not in itself imply that his mentality is such as to render his testimony inadmissible. This must be considered as a separate question, though the fact that he suffers from such a severe defect should arouse the suspicion of injury to the other functions of the brain also, hence the general character and attainment of such a witness should be carefully considered before it is definitely decided to admit his testimony. Again, in probably the majority of cases an interpreter, usually a mute himself, who can talk in sign language is needed and his reliability and tact in translating the questions must be established. His observations in this trial showed the author that deaf mutes have certain marked peculiarities of expression, that their conception of certain ideas is quite unclear as compared to that of the average individual. For instance there was difficulty in making one of the girl witnesses understand what was meant by "unchaste" and she finally said that the wind was this, because it blew her skirts up. There is a marked difference between those completely deaf and those who have retained a rudimentary hearing and who can be taught to speak. Still the speech of these is frequently not clear to ordinary persons and may need to be interpreted by one familiar with deaf mutes.

14. *Self-Mutilation in General Paresis.*—A man 37 years old, who had been a teacher of gymnastics, became depressed following financial losses and when examined by the author presented the somatic signs of general paresis. It was recommended that he be committed to an asylum, but since his wife refused to consent to this and he had shown no tendency to injure himself and was not antisocial it was finally agreed that he should be placed in a private sanitarium for nervous diseases with the understanding that he should be at once transferred if there were any signs of trouble. He conducted himself in an orderly manner and seemed satisfied. On the evening of the fifth day of his stay he was somewhat restless and was given a mild hypnotic. At 2:30 he called the night nurse saying that he could not sleep and was given by her some medinal and watched for a half hour until he fell asleep. Next morning as everything remained unusually quiet in his room the nurse entered at 8:45 and found him collapsed in bed he having with a knife cleanly severed his right hand at the radio-carpal joint. He was at once rushed to a hospital where the stump was properly managed and recovered. He did not appear to have experienced any pain. The incident shows how suddenly the impulse to violence may come on in a paretic and how unsafe it is to leave such patients without proper watching.

15. *Epilepsy and Sedobrol.*—Those having charge of a number of epileptics having tried one after another the various medicaments recommended, usually in the end discard the others and rely upon a salt-poor diet and an amount of alkaline bromide suited to the needs of the case. A valuable addition to our therapeutic armamentarium has been found by the author

to be Sedrobol prepared by Hofmann-La Roche & Co., which is supplied in 2 gm. tablets each containing 1.1 NaBr together with certain organic constituents and which dissolved in water forms a basis for a palatable soup, to which other salt-free savory additions may be added according to the skill of the cook. He finds this preparation particularly well taken by children.

16. *Julian-Claudian Rulers.*—An interesting study of the sovereigns of this famous family as they are depicted in the writings of various historians ancient and modern. From constant intermarriage both good and bad traits became accentuated and in the later rulers the latter seem to have predominated. That the craze for power, excesses, ideas of persecution and cruelty manifested by many of them was in large measure due to the times and their situation seems undoubted and on account of the frequency of intrigues and conspiracies the fear of violent removal was in most instances only too well founded. Also since many accounts of them have come down to us from those openly hostile, their bad qualities have no doubt, in some instances at least, been exaggerated. Julius Cæsar in spite of his greatness is asserted by Suetonius to have suffered from epilepsy and to have been homosexual. Augustus is estimated by our author as mentally entirely normal, though he may have had some weaknesses of moral character. Tiberius is variously estimated and has been asserted to have suffered from attacks of melancholia, but our author thinks that though accounts of him show that he was peculiar and of a melancholic disposition he was never really insane. Caligula he considers as having suffered from congenital weakmindedness and thinks that his impulsive cruelty suggests an epileptic trait. Claudius was a degenerate, slow to develop and badly brought up, of weak will and with a tendency to sudden outbursts of rage. His degeneration can be traced to consanguinity and many of his bad qualities seem to point directly back to certain of his ancestors. Nero suffered from an excessively bad heredity especially upon the female side and can be considered as a psychopathic personality, a degenerate with contrary sexual tendencies. The author cannot find that any of the rulers of this house were afflicted with what Parsenow has described under the name of " Caesarenwahn " (feeling of near approach to the Deity, unrestrainedness, cruelty and ideas of persecution, *i. e.,* fear of being removed).

Although it is not so designated, this number of the Zeitschrift may well as considered a " Schüle Festschrift " since all the authors have been at one time or another assistants at Ilenau under the directorship of this Nestor of the psychiatrists.

C. L. ALLEN (Los Angeles).

Original Articles

PROGRESSIVE VAGUS–GLOSSOPHARYNGEAL PARALYSIS WITH PTOSIS. A CONTRIBUTION TO THE GROUP OF FAMILY DISEASES[1]

By E. W. Taylor, M.D.

BOSTON,

ASSISTANT PROFESSOR OF NEUROLOGY, HARVARD MEDICAL SCHOOL; CHIEF OF NEUROLOGICAL SERVICE, MASSACHUSETTS GENERAL HOSPITAL

With the increase of our knowledge of the so-called family diseases of the nervous system, it has become increasingly evident, whatever ultimate classification may be adopted, that these diseases may roughly be divided into two groups: First, those which, although distinctly hereditary in character, are too varied in symptomatology to permit of classification as disease entities; and secondly, those which are absolutely sharply defined in their manifestations. In the first group, may in general be included the various forms of atrophy and dystrophy of hereditary type, which run into each other in such a way as to preclude the possibility of distinct individuality. On the other hand there are certain conditions which on account of their constant manifestation may properly be regarded as entities, whatever their broader relation to the hereditary group in general may eventually be shown to be. In this group, amaurotic family idiocy, family periodic paralysis,

[1] Read at the fortieth annual meeting of the American Neurological Association, May 7, 8 and 9, 1914.

Thomsen's disease, are somewhat typical examples. The condition about to be described may properly be classed with this latter group because of the absolute definiteness of the signs and symptoms which so far as ascertainable have occurred in identical form in all the cases which have been observed. So far as I am aware, this type consisting in paralysis of the vagus-glossopharyngeal group as concerned in the act of swallowing, together with ocular ptosis, has not hitherto been described. The history of the case which has come under observation is as follows:

V. P., Figs 5 and 6, a French Canadian by birth, 59 years old, married, presented herself on November 11, 1913, at the Laryngological Department of the Massachusetts General Hospital, with the complaint that she was unable to swallow so well as formerly, that she was growing worse, and that she thought her "throat passage" was becoming smaller. She had noticed the difficulty over a period of two years. Examination in that department

Fig. 1. From this chart it appears that the parents of the generation to which the patient belongs had seventeen children, of whom eight died under the age of ten, seven lived to adult life, two males dying of the disease at the ages of sixty-seven and sixty-eight, respectively, a third male dying at forty-five of some other affection. Of the four females one has died of the disease at the age of sixty-eight, the patient under observation has the disease and is now fifty-nine years old. Another female died at the age of forty-seven of some other disea e, leaving but one living at the age of fifty-seven who, so far as ascertained, has not been affected by the family disorder. It will be seen, therefore, that with but one exception, all the members of this family who have attained the age of fifty or more years have died of the disease. The matters of special interest are the undoubted similarity of the affection in all of the cases and the fact that although definitely hereditary in character, the disease has not been known to begin before the fiftieth year. The next generation numbers thirty-six, the oldest being forty-two. The disease has not appeared so far as known in any member of this generation. The next or fourth generation already numbers many children without record of the appearance of the family affection. An intensive study of this family for the next fifty to one hundred years is clearly a matter of much interest and importance.

showed that both the pharynx and the larynx were normal and that a bougie could be passed into the stomach without resistance. An X-ray threw no light on the matter, and a provisional diagnosis of cardiospasm was made. The patient was referred to the Neurological Department with a request for an explanation of the cause of the difficulty in swallowing.

Examination at this time and on many subsequent occasions gave the following facts: She first noticed a tendency to drooping of the eyelids about four years ago. Following this at an interval of about a year, she began to have difficulty in swallowing. Both of these conditions had grown gradually worse, so that at the present time (summer of 1914) she swallows with very considerable difficulty and is only able to take solid food by combining it with a large amount of water or tea. Otherwise, as she expressed it, "the food seemed to clog up in the passage." Beyond a tend-

Fig. 2. Mother. Died of the disease. Age 77. Ptosis. Paralysis of deglutition.

ency to constipation, she had no further complaints. Her bodily functions were normal and, except for the difficulty mentioned, she regarded herself as well.

She was the mother of ten children, and had had no difficulty at their birth. She had had no miscarriages, and had always led a life of activity and hard work.

Examination in detail was as follows: Cranial nerves: The first nerve showed no abnormality; the second, no impairment of vision; the fundus normal; the discs somewhat indistinct in outline, with marked physiological cupping and no swelling; the vessels of normal appearance. Third nerve, equal ptosis of both eyes, partially covering the pupils (see Fig 6). The eyes could be closed with sufficient muscular strength; the ocular movements were normal in all directions. There was possibly a slight nystagmus on the right when looking inward; the fields were normal. Pupils were moderately dilated and reacted promptly to light and

on accommodation, as well as consensually.   Fourth nerve,
normal.   Fifth nerve, no disturbance either in the sensory or
motor branches.   Sixth and seventh nerves, normal.   Eighth
nerve, watch-tick heard at about four inches on each side; air
conduction better than bone conduction.   Ninth and tenth nerves,
palatal reflexes well preserved; no disturbance in breathing, in
phonation, or in other functions subserved by this group of nerves,
excepting a pronounced difficulty in swallowing, particularly solid
food.   It was possible to take soft food and liquids, although on

Fig. 3. Son.   Died of the disease.   Age 67.

testing, the difficulty was apparent.   Within the last few weeks,
difficulty in swallowing had markedly increased.   The eleventh
nerve showed no defect.   Twelfth nerve, tongue rather slender,
protruded in the median line without tremor and with absolutely
no evidence of atrophy.   It was freely movable, and there was no
speech defect whatever.

The arms showed no abnormality either in strength, sensation,
coördination, or reflexes.   The legs were normal in strength and
without evidence of ataxia or other disturbance.   Knee-jerks were
normal.   There was no Babinski response, no clonus, normal but
slight Achilles; no objective or subjective disorder of sensation
in the legs; no Romberg sign.   There was no evidence of disorder
of the internal organs with the exception of the circulatory appa-
ratus and the kidneys.   The heart was negative except for an
accentuated second aortic sound.   The pulse was 84 and full;
the blood pressure on one occasion, 200 systolic; on another, 230
systolic, 115 diastolic.

Examination of the urine on April 25 was as follows: Pale; sp. gr. 1002; reaction slightly acid; albumin, slightest possible trace; no sugar. Sediment: small amount containing several epithelial cells, typical bladder and vaginal, and a few large round
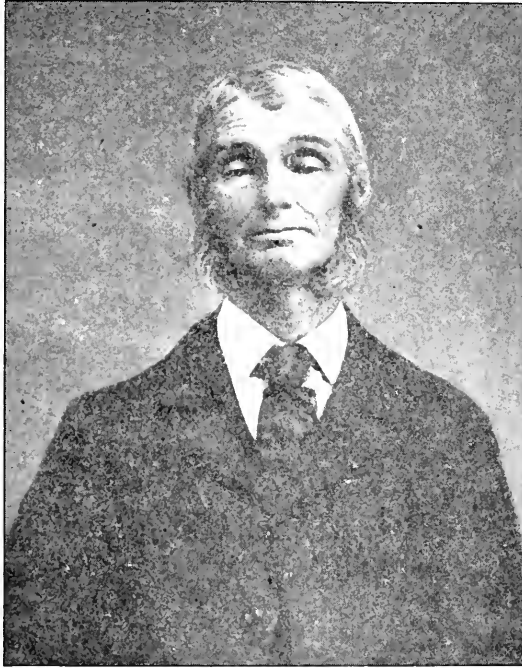

Fig. 4. Son. Died of the disease. Age 68.

cells from the pelvis of the kidney or neck of the bladder. Several leukocytes; a few mucin shreds, a few uric acid crystals, and a small amount of amorphous urates.

On one occasion, the amount passed in twenty-four hours was estimated as three pints, which presumably was an error in observation. (It has not been possible to keep the patient under close hospital observation.)

Examination of the blood showed hemoglobin 95 per cent.; Reds: normal size and shape, no poikilocytes, micro- or macrocytes; no blasts; no organisms; no acromia; no stippling; no increase of platelets; no excess of fibrin. Whites: differential counts of 318 cells; polymorphonuclears (neutrophils, 72.9 per cent.; eosinophils, 1 per cent.); basophils (large mononuclears, 4.4 per cent.; small mononuclears, 19.7 per cent.); transitional forms, 2 per cent. Wassermann reaction in the blood negative.

Family History.—The patient's mother died at the age of 77, and for many years preceding her death, suffered from an increasing difficulty in swallowing together with a definite ocular ptosis. Death ultimately resulted from starvation (Fig. 2). Her father was normal so far as known. There were fifteen children of this marriage, of whom eight died under the age of ten. Of those living to adult life, there were four females and three males. Of these, two males and one female have died at the ages of 67, 68 (Figs. 3 and 4) and 68 respectively, with precisely the same

Fig. 5 Daughter. Before onset of the disease (patient under observation).

symptoms as those of the mother, and of the patient whose history is detailed above; namely, paralysis of deglutition with ptosis. One male of this generation died at the age of 45 of another affection; another female at 47, also of some other disease; leaving only a single female living excepting the patient. This woman is now 57 years old, and so far as ascertained is unaffected by the disease. It is a tradition in the family, which has been amply borne out by the facts so far observed, that the

disease never begins before the fiftieth year, a fact certainly of extreme interest, to which allusion will later be made. With one exception, all the members of this generation have been married and have had large families, for the sake of clearness omitted from the accompanying chart. Inasmuch as none of these have

Fig. 6. Same as Fig. 5. Definite signs of the disease. Age 59. Ptosis and progressive paralysis of deglutition (patient under observation).

reached the age of fifty years, according to the family tradition, the disease has not yet appeared.

From the foregoing family history, it appears that with one exception every member of the generation to which our patient belongs who has reached the age of fifty years has died of the disease. Although detailed information regarding those who have died is lacking, it has become definitely established in the family that starvation with drooping of the eyelids occurred in each case, with striking similarity. The definite character of the disturbance with its inevitable fatal outcome renders this testimony trustworthy. An unmarried sister of the patient died at the age of

68 in an institution under the charge of a Catholic sisterhood.
The sister superior has kindly written me the following statement
regarding this patient.   She says in her letter, " This person
(A. B., a sister of my patient) came to our institution some years
ago, not because she was at the time very ill but rather because
she was aged and wished to finish her days in our home.   She
suffered from paralysis of deglutition which resulted in starva-
tion.   She had a very peculiar affliction of the eyes also which
I have never seen before.   She died here about five years ago ; our
house physician attended her.   He relieved her somewhat, but
could not cure her."   There can be no doubt that these symptoms
were identical with those from which my patient is now suffering.
No definite information is obtainable of the mother's illness or of
the two brothers who have died, beyond the essential fact that
they all starved to death and had a peculiar drooping of the lids.

I am unable to find any reference in the literature of the
family hereditary affections to this disturbance.   It is unique in
the fact of the cleancut character of the symptoms and signs
which have appeared in all the persons affected in the same form,
namely : ptosis and paralysis of deglutition without other evidence
of disorder of the nervous system.   The fact that it never has
occurred before the fiftieth year is likewise of peculiar interest.
In the recently published " Handbook of Neurology " edited by
Lewandowsky, Jendrassik writes an exhaustive article on the
hereditary diseases, followed by a bibliography of nearly five
hundred references, without allusion to the symptom-complex
under discussion.   Under the heading, " Hereditary ptosis and the
hereditary ocular muscle paralyses," cases are mentioned in which
ocular paralyses often associated with facial paralysis occur both
as congenital affections and also developing in later life.   Jen-
drassik himself has observed in two sisters at the thirtieth year
a gradually developing ptosis followed by complete external
ophthalmoplegia, paresis of the facial nerve, and loss of the patella
reflexes.   In these cases there is also a certain disorder of speech.
It is hardly necessary to state that such cases bear only the most
distant relation to those under consideration, owing to the wide-
spread character of the paralysis and a coincident involvement of
the spinal cord.   Bernhardt,[1] in a paper entitled *"Beitrag zur
Lehre von der familiären Erkrankungen des Nervensystems,"* in

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[1] Bernhardt, Virchow's Arch., 1891, CXXVI, 59.

1891, described certain cases, all occurring after thirty, in which there were marked bulbar symptoms associated with speech defect and spasticity of the extremities. Beyond the fact of a bulbar involvement, these cases likewise evidently bear no intimate relation to the affection under discussion. Oppenheim, in his discussion of progressive bulbar paralysis, alludes also to an apparently hereditary type occurring in children as described by Fazio, Charcot, Londe, and Brissaud-Marie, evidently a family character, in which also certain stigmata of degeneration occurred. This condition is, however, so far removed from our cases that they require no further description, if for no other reason than that it appeared in childhood.

Classification.—It is difficult to classify these cases in any recognized group. The various myopathies, ably discussed with regard to their interrelation by Oppenheim and Spiller at the last international congress of medicine in London, cannot be considered to include this type. There is, in the first place, no evidence that the disease is to be regarded as a primary muscular affection; the pathology is rather to be sought in a curiously selective process of degeneration occurring in a limited number of cells of the vagus-glossopharyngeal group, and a single cell-group of the oculomotor nucleus. It should, in this connection, be borne in mind that the eyelids contain smooth muscle fibers innervated by the sympathetic, the function of which is to widen the lid opening. The paralysis of these fibers may produce a narrowing of the space between the lids, giving rise to an incomplete ptosis. When, however, a ptosis is due to this cause, there is commonly a reduction in size of the pupils, which did not occur in this case; nor was there other evidence of sympathetic involvement. It is fair, therefore, to presume that the ptosis is not due to this unusual cause, particularly in view of the associated difficulty in swallowing.

The peculiarity of the affection lies in the fact that although very chronic in course, extending over a long period of years in each instance, no other nerves are involved, thus differentiating it sharply from an ordinary type of bulbar or pseudo-bulbar paralysis. There is no record that the hypoglossal nerve is ever affected. It certainly shows no sign whatever of degeneration in the case which I have had the opportunity to observe.

A more important consideration is the possibility that the

affection might be considered a form of myasthenia gravis. The photographs of the various persons affected lend a certain weight to this idea, inasmuch as the ptosis alone is visible, which constitutes a conspicuous characteristic of the myasthenic face. It is, however, exceedingly unusual that the weakness in myasthenia gravis is limited consistently to single muscles, as is clearly the case in the affection under consideration; nor is there any evidence to show that in myasthenia gravis the disease occurs in precisely the same form on an hereditary basis. Furthermore, myasthenia gravis usually manifests itself before the fiftieth year. It is not possible to demonstrate the myasthenic reaction, or the fatigability of the muscles beyond what one would expect in any case of muscular weakness, such as our patient presents. Furthermore, the tendency to remissions, as frequently observed in myasthenia, is wholly lacking in this case. One is, therefore, justified in excluding the symptom-complex from the ordinary myasthenia gravis; and even if further investigation should prove that it might be classified in this category of disturbances, the fact of its peculiar localization and constant appearance in hereditary form, only occurring after the fiftieth year, would still render the affection unique.

Etiology.—In the present state of our knowledge, any attempt to discover an adequate cause for the appearance of such a disorder in many members of a single family must prove futile. No doubt it may properly be considered one of the abiotrophies as described by Gowers; but this manifestly does not serve as an explanation. That there is a defective vitality may readily be assumed, but why such a defect should occur with uniformity in just these nerves remains wholly obscure. It is furthermore an added mystery that such a defect should never manifest itself until well past middle life, and in otherwise perfectly healthy persons without apparent hereditary defects or other nervous disability. The theory of over-use as propounded by Edinger likewise does not offer even a workable hypothesis. Sclerotic changes in the blood vessels occur to one as a possible explanation but although such changes may well underlie the condition, the fact of chief importance is naturally not touched, namely: that just these nerves are affected by such a process and no others. It is clearly necessary to go behind any such superficial explanation if we are to arrive at a reasonable etiology, and this is at present

impossible. In our case there is strong probability of a coincident renal affection of a degenerative sort, as shown by the urinary examination; but this fact in no way helps towards a solution of the main question.

Prognosis and Course.—My patient noticed her first symptoms about four years ago. She now has a considerable degree of ptosis, as shown in Fig. 5, but is still able to swallow, although with much difficulty, and shows no signs of emaciation from lack of nourishment. It is probable that she will live several years, so that in her case the course of the disease may be approximately estimated at seven or eight years. Beyond the fact that the other members of the family dying of the disease are known to have been ill for a long period, no definite data are at hand. In this respect the degeneration does not differ from others involving cranial nerves important to life.

Summary and Conclusions.—A clearly defined disease or symptom-complex exists not hitherto described, consisting of ocular ptosis and paralysis of deglutition coming on after the fiftieth year, and leading to death without further involvement of the nervous system.

The affection is certainly to be classed among the family hereditary diseases, as shown by the fact that it has occurred in two generations, in the second affecting all but one of those who reached the age of fifty years.

The disorder is peculiarly remarkable in that although hereditary in type, it has not been known to occur in early life, and must therefore be regarded as superinduced in predisposed persons by conditions arising in the degenerative period of life.

The justification for regarding the affection as a distinct entity lies in the facts that so far as ascertainable it occurs in precisely the same form in all persons affected and also invariably in the declining years of life.

PUNCTURE OF THE CORPUS CALLOSUM WITH SPECIAL REFERENCE TO ITS VALUE AS A DECOMPRESSIVE MEASURE[1]

By Charles A. Elsberg, M.D.,

NEW YORK

In order to institute the proper treatment for the relief of conditions of increased intracranial pressure, the neurologist and the surgeon must have a clear understanding of the physical changes that occur in the pressure conditions within the skull cavity from a growing tumor or expanding lesion. We are apt to think that the encroachment of the growing tumor is the main cause. The increase of pressure is due not only to the added bulk of the new growth, to the cerebral edema which accompanies intracranial neoplasms and first described by Reichardt, or to the hyperplasia of the affected lobe recently demonstrated by Spiller, but also to the internal hydrocephalus which so often complicates tumors of the brain.

The free communication between the ventricles and the subdural spaces of the brain and cord is a necessity for the proper functionizing of the brain; when the cerebrospinal fluid can no longer flow from the lateral ventricle through the Sylvian acqueduct to the fourth ventricle and the spinal canal, symptoms due to increased intracranial pressure soon appear, which are well known and which the surgeon has attempted to relieve in a variety of ways.

The general symptoms of increased intracranial pressure are therefore often due to the stagnation of the cerebrospinal fluid and the distension of the ventricles. The same condition may result from an oversecretion of ventricular fluid. Increase of pressure within the cranial chambers results in the compression of the yielding walls of the cerebral veins, with a resulting congestion and edema, and the collection of edematous fluid in the ventricles. This is especially apt to occur when a tumor grows

in a location where it will exert direct pressure upon the veins in the interior of the brain, upon the choroid plexuses and the veins of Galen. Marked distension of the ventricles occurs early in tumors in the posterior fossa where pressure upon the aqueduct is frequent.

A careful investigation of a large series of brain tumors has shown me that more or less distension of the ventricles is present in about seventy-five per cent. of cases in which a new growth is found at operation or autopsy (372 out of 500 cases) ; the intra-ventricular fluid must be a very important factor in the causation of the increase of intracranial pressure in these cases.

Is it not surprising that in the cases in which the cause of the raised pressure could not be removed (*i. e.*, a tumor excised, cyst or abscess drained, etc.) so much attention has been paid to the methods for diminishing the tension by the removal of part of the bony wall of the skull and the incision of the dura (decompressive craniotomy), and so little to means for the permanent decrease of the important ventricular distension? Repeated lumbar puncture has sometimes been performed with this purpose in view, but it is only a temporary measure, and harmful or even dangerous in subtentorial disease.

As a palliative operation, cerebral decompression has found extensive usage in states of acute intracranial pressure elevation (fracture of the skull, etc.) ; in tumors of the brain there may be little or no benefit from the operation. In some instances (midbrain lesions) a subtemporal decompression may exaggerate the symptoms. Finally, the great disadvantage of a decompressive craniotomy is that the patient is left with a deformity which is marked in proportion to the amount of increase of intracranial pressure.

Attention was directed to the significance of the internal hydrocephalus which accompanies brain tumors when a method was devised to treat an entirely different condition, congenital or acquired chronic internal hydrocephalus. Many attempts had been made to benefit these patients; the fluid from the ventricles had been drained into the subcutaneous tissues, but cerebrospinal fluid is not absorbed from the cutaneous tissue and large collections of fluid resulted. Attempts have been made to drain the ventricular fluid into the subdural spaces by means of small silver canulæ. One operator, and he a brain surgeon of wide experience, actu-

ally proposed and tried to drain the fluid into the peritoneal
cavity; while another made a connection between the ventricles
and one of the large veins of the neck or one of the venous sinuses
in order to drain the fluid directly into the blood stream. It re-
mained for Anton and von Brahmann to devise a simple method
for the making of a permanent communication between the ven-
tricles and the subdural space over the cerebral convexities, by
means of puncture of the corpus callosum.

A small incision is made at right angles to the median line
beginning one or two centimeters away from the median line and
one to two centimeters behind the coronary suture. With a
trephine, a button of bone is removed and a small incision made
in the dura. A small bent canula of German silver is now intro-
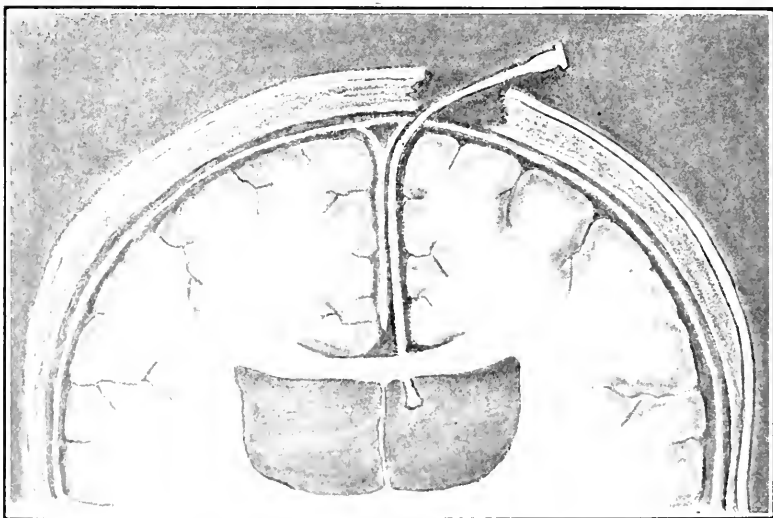
Fig. 1. The Surgical Anatomy of Puncture of the Corpus Callosum.
The curved canula is seen passed through the opening in the skull and
dura, by the side of the falx cerebri, and through the corpus callosum
into a lateral ventricle.

duced through the small slit in the dura and pushed toward the
median line until the resistance of the falx cerebri is felt. The
blunt point of the canula is now slid along the side of the falx
until the corpus callosum is reached. With slight pressure the
corpus callosum is perforated near the genu and fluid escapes
from the ventricle. (See figure 1.). The opening in the corpus

callosum is now enlarged by manipulating the canula so that a slit about one centimeter in length is made. The canula is now withdrawn, the small opening in the dura closed by one fine silk suture, and the skin wound closed. On account of the higher pressure in the ventricles than in the subdural space, fluid continually passes from the ventricles to the subdural space over the convexity of the hemispheres and the opening in the corpus callosum therefore remains patent.

The results obtained by Anton and von Brahmann in the treatment of internal hydrocephalus were very promising and led them to believe that puncture of the corpus callosum was a very satisfactory method for the relief of internal hydrocephalus if the patients were operated upon before the convolutions had become flattened and destroyed by the pressure and before optic atrophy had occurred. Of 17 cases of congenital hydrocephalus operated upon by von Brahmann, the optic neuritis had gone on to almost complete atrophy in 15 of them before the patients came under observation. Spasticity and ataxia were diminished even in these patients, the intelligence was improved in many, and some of the children developed normally after the little operation. They then tried the operation in other cerebral conditions. Up to the time when their monograph was published they had operated upon 17 cases of simple hydrocephalus, 5 of tumor of the hypophysis with dilatation of the third ventricle, 23 cases of tumor in or near the ventricles, 4 cases of epilepsy, 2 of non-supurative meningitis, and 1 of " Turmschaedel." A number of the patients were much improved after the callosal puncture.

During the past two years I have performed puncture of the corpus callosum 37 times. The operation has never been difficult and all of the patients recovered from the little operation without any bad after effects.

Puncture of the Corpus Callosum in the Non-Obstructive Hydrocephalus of Children

I have operated upon 7 children who suffered from the non-obstructive variety of hydrocephalus. All had much enlarged heads, with more or less spastic extremities and with the retinoscopic evidences of different grades of optic atrophy. Two of the patients were much improved. In one child in whom callosal

puncture was done about three months ago, a very marked improvement in all of the symptoms occurred. The child was apparently blind, the pupils did not react to light, there was marked spasticity of all of the extremities, marked nystagmus, and great enlargement of the head. Two months after the operation, the head measured five centimeters less in all directions, the pupils reacted well to light, the child seemed to recognize objects about it, and nystagmus and spasticity had almost entirely disappeared.

From the reports in the literature and from my own experience I believe that puncture of the corpus callosum is the best method up to the present time for the relief of non-obstructive internal hydrocephalus, and if the little patients come to us early enough before irreparable damage has been done to the brain and irremediable changes have occurred, we should be able to relieve entirely a great many of them.

Puncture of the Corpus Callosum as a Decompressive Method in Tumors of the Brain

A consideration of the mechanical factors involved in cerebral decompression, and the physical changes that occur when a de-
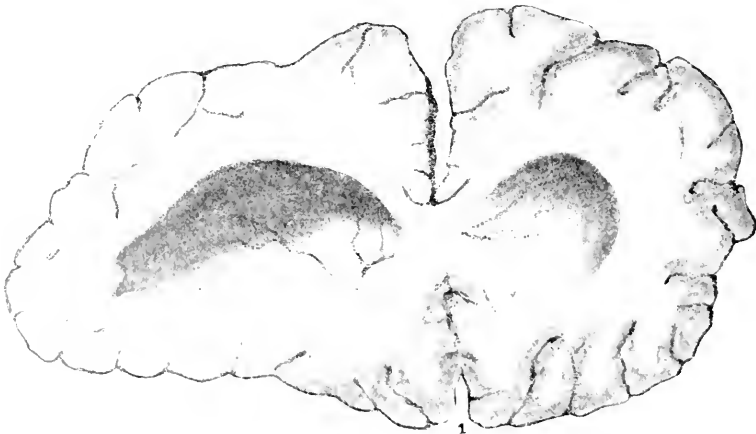
Fig. 2. Transverse Section through the Brain at the Genu of the Corpus Callosum in a case of brain tumor with marked internal hydrocephalus. A subtemporal decompression had been done. Note the marked distortion of the brain and ventricle. (From Anton and v. Brahmann, " Der Balkenstich," Berlin, 1913.)

compressive craniotomy has been done, has led me to suggest to you a viewpoint which may be somewhat novel. It seems to me

that up to the present time we have paid insufficient attention to
the lines of force along which the brain tissues are being dislo-
cated after a decompressive operation. The best decompression
must be one in which the brain tissue is dragged upon or pushed
in such a way that the smallest number of nerve tracts are inter-
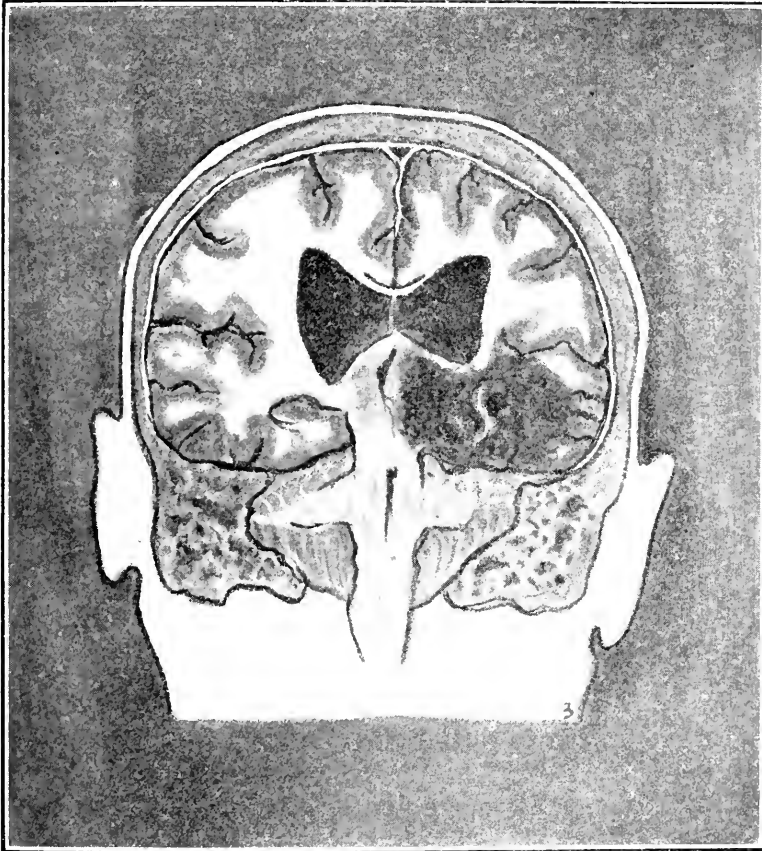fered with. I have examined the brains of a number of patients

Fig. 3. Tumor of the Right Temporal Lobe with internal Hydro-
cephalus (diagrammatic reconstruction from anatomical specimen). In
a case of this kind, the distortion shown in Fig. 2 would be apt to occur.

who have died from irremovable brain tumor and in whom a pal-
liative subtemporal or suboccipital decompression had been done.
In supratentorial lesions there was usually considerable internal

hydrocephalus, and the distended lateral ventricle of the operated side or the third ventricle was dragged upon or distorted (Fig. 2). Much harm was surely done to important nerve tracts by this unnecessary distorsion of the brain, and just as much space
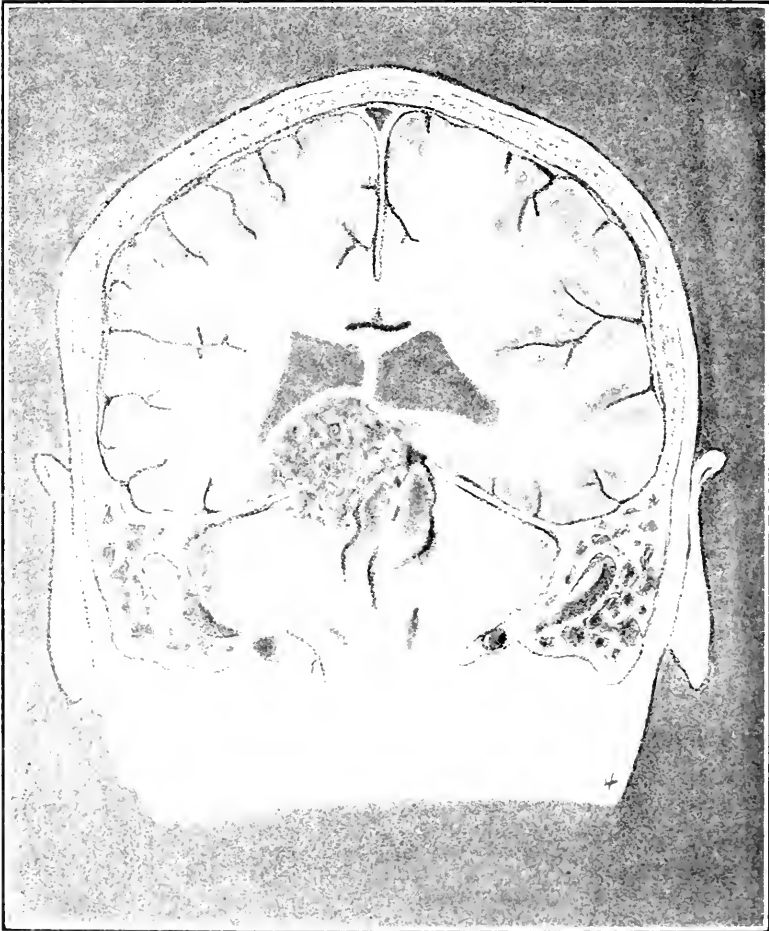

Fig. 4. Mid-brain Tumor with Hydrocephalus. A type of growth in which the symptoms would be apt to be made worse by a subtemporal decompression on the right side.

would often have been gained and mechanically a more correct decompression have been accomplished by means of puncture of the corpus callosum and permanent autodrainage of the ventricles,

perhaps combined with a decompressive craniotomy (Figs. 3 and 4.)

Motor tract symptoms are to be made worse in a left or right mid brain tumor by a subtemporal decompression on the right side; the symptoms of a tumor which lies medianward to the internal capsule may be exaggerated by a subtemporal decompression (Fig. 5). Inasmuch as a considerable amount of ven-
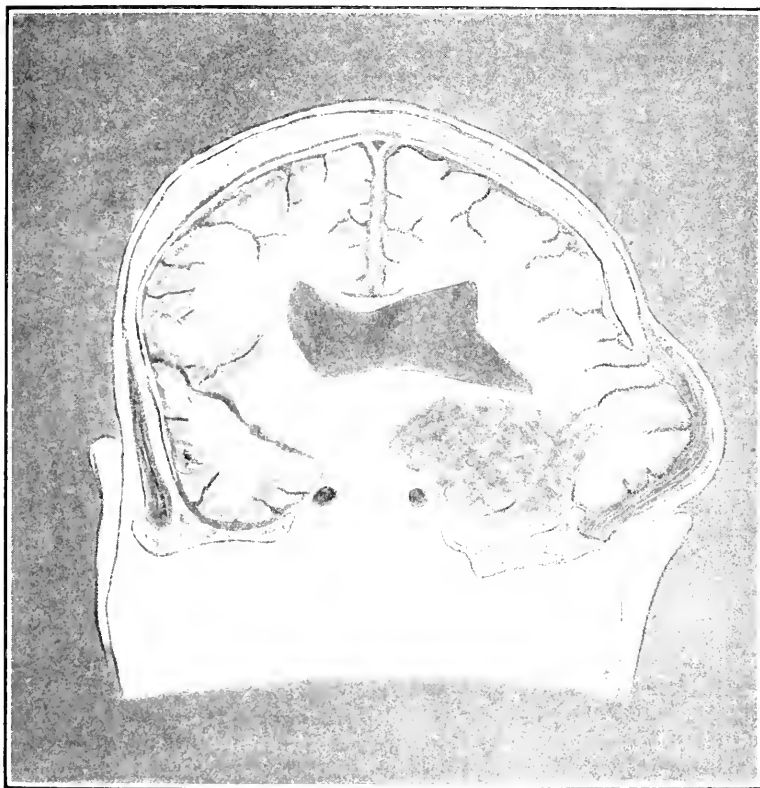

FIG. 5. Infiltrating Tumor of the Temporal Lobe with Hydrocephalus in which a subtemporal decompression had been done. In a case of this kind a puncture of the corpus callosum should also have been done (diagrammatic sketch from anatomical specimen).

tricular distension always accompanies these new growths, it would be much more reasonable to attempt to relieve the symptoms by a method which will permanently relieve the internal hydrocephalus than by a unilateral or bilateral decompression.

Similarly, much of the headache, vomiting, and optic neuritis which result from expanding lesions in the subtentorial region, are due to the high grade of internal hydrocephalus. When a palliative operation is to be done, it is therefore better to get rid of the ventricular distension by a simple operation, than to do the more serious suboccipital decompressive craniotomy

In addition to the advantages of puncture of the corpus callosum above enumerated, the absence of a deforming hernia in the subtemporal or suboccipital regions is an advantage not to be underestimated.

In short, I believe that puncture of the corpus callosum is of great value, not only as a temporary palliative method in unlocalizable tumors of the brain, but in many instances, the best palliative operation in irremovable cerebral and cerebellar neoplasms.

I have used this method 30 times instead of or combined with decompressive craniotomies, and in a considerable number of patients have seen great improvement follow the operation. In more than one half of the patients, an immediate improvement occurred; the headache was relieved, the swelling of the optic nerve heads decreased and sometimes subsided entirely. In several cases, the operation was done without any anesthesia because the patients were in stupor or coma. In two of these, the patients became conscious and answered questions before they left the operating table. I have had one patient with advanced symptoms of a mid brain tumor so much relieved for more than six months, that he was able to return to his work. The headache and swelling of the discs disappeared rapidly, and ocular palsies subsided.

The following are examples of the results that I have obtained:

Madeline W., 3 years of age, inoperable cerebellar tumor involving the worm and both hemispheres. Puncture of the corpus callosum at the New York Neurological Institute. Papilledema before operation, 4 D. in each eye; after operation, papilledema entirely disappeared in three weeks. Drowsiness which existed before operation entirely disappeared.

Walter D., Neurological Institute, service of Dr. Bailey. Mid brain tumor, marked drowsiness, incontinence, double Babinski, papilledema 1 D. Puncture of corpus callosum. Result: Disappearance of severe headaches, normal sensorium, full control of bladder and rectum, disappearance of pathological reflexes, subsidence of the papilledema.

Dr. R., mid brain tumor or growth near a ventricle. Private patient of Dr. Bailey at the New York Neurological Institute. Increasing symptoms with advancing optic neuritis. Patient in coma when puncture of corpus callosum was done. Ventricles contained greenish colored fluid. Operation done without anesthesia. Fifteen minutes after the operation, patient was awake and conversed freely with nurses and physicians.

Jack F., 27 years of age. Service of Dr. Lilienthal, at Mount Sinai Hospital. Marked mid brain symptoms with choking of discs, ocular palsies, diplopia, very severe headaches so that patient cried out with pain if he made the slightest movement. Puncture of corpus callosum. Within two weeks, disappearance of all of the symptoms above mentioned. Patient much improved for six months.

In almost all of the patients some improvement occurred. In the patients in whom no increase of ventricular fluid was found, there was of course no change in their condition, and other decompressive methods had to be resorted to.

The operation of puncture of the corpus callosum has given us such satisfactory results that it is the operation of choice in mid brain tumors, in unlocalized intracranial growths, in subtentorial neoplasms in which a palliative operation is to be done. If the headache and the optic neuritis require a decompressive operation before the tumor can be localized, I now do a callosal puncture, and only add a subtemporal or suboccipital decompressive craniotomy either if little or no distension of the ventricles exists, or if the callosal puncture has not relieved the papilledema and the other general tumor symptoms

The operation is only a palliative or temporizing measure, and the radical removal of the tumor should always be done if that be possible. As a palliative method, however, I can highly recommend this little operation, which deserves a more extended use than it has up to the present time received.

My experience is not large enough to state exact percentage results, nor is it possible to say how often the opening in the corpus callosum will remain patent.

PULMONARY COMPLICATIONS OF APOPLEXY[1]

By Philip Coombs Knapp, A.M., M.D.,

VISITING PHYSICIAN FOR DISEASES OF THE NERVOUS SYSTEM, BOSTON CITY
HOSPITAL

When a patient is stricken with apoplexy, the presence of râles
in the lower part of the lungs is of grave omen. They not only
serve to some degree as an index of the gravity of the seizure,
but they indicate a new danger. Patients do not necessarily die
on account of the pulmonary complications of apoplexy, but these
complications often contribute to the fatal issue, and, in some
cases, could they be prevented, the patient might recover from
the shock.

In most cases these complications are due to one of two patho-
logical processes,—hypostatic pneumonia, due to a more or less
rapidly developing edema, or inhalation pneumonia, due to the
entrance of mucus, food or germs into the bronchi from the
mouth. The former process may depend upon some vaso-motor
disturbance, and sometimes comes on very soon after the shock,
developing with great rapidity until both lungs are filled with
fluid. The accumulation of fluid follows the ordinary laws of
gravitation and is first noticed in the lowest parts of the lung.
Inhalation pneumonia is of slower development, coming on with
the increasing invasion of the lung by foreign substances, in stu-
porous patients who can neither cough nor swallow satisfactorily.
The two processes may occur in the same patient, and all sorts of
variations in their development may be found. A patient may
succumb in a few hours with both lungs filled with râles, or he
may linger for several weeks, or even a month or two. Other
forms of pulmonary disease are merely coincidences, but these
are dependent directly upon the apoplectic condition.

The location of the lesion in the brain has little to do with the
development of these forms of pneumonia. Charcot once held
that the lesion caused vaso-motor changes on the opposite side of

[1] Read at the fortieth annual meeting of the American Neurological
Association, May 7, 8 and 9, 1914.

the body, leading to edema, etc., in the opposite lung. Strümpell thought that the process began in the lung of the paralyzed side, owing to the diminished respiration in that lung from paralysis of the respiratory muscles. That these muscles are usually affected is an accepted fact, but the symptoms, even at their onset, are usually bilateral. In but three cases out of one hundred and twenty, did I find one lung affected, and in only one of these cases was it affected on the paralyzed side. In a fourth case of left hemiplegia râles were found in the right upper and the left lower lobes. In two cases of croupous pneumonia, the lung was affected in one case on the sound side and in the other on the paralyzed side.

My data in regard to the pulmonary complications of apoplexy are derived from two hundred and six cases in my service at the Boston City Hospital. Of these one hundred and twenty patients died in the hospital. I have not attempted in this enumeration, to differentiate between the various forms of lesion,—hemorrhage, thrombosis, embolism,—which gave rise to the apoplexy. Seventy of these cases presented the ordinary symptoms of hypostatic or inhalation pneumonia,—difficulty in breathing, slight fever, râles in the lower posterior portions of the lungs, and eventually signs of consolidation. Eight others showed slighter signs of respiratory disturbance,—harsh or irregular respiration, prolonged expiration, and the like, without râles or definite signs of consolidation. Two-thirds of the fatal cases, therefore, showed some evidence of pulmonary involvement. Out of eighty-six cases discharged from the hospital, forty-three or exactly one half, showed some disturbances, but in only sixteen were they marked. None showed the rapid filling up of the lungs often met with in severe cases, which is probably to be regarded as an agonal symptom.

I have brought up this subject not because it is particularly novel or unknown, but because the majority of the text-books on internal medicine and nervous diseases deal with it in a very inadequate manner, both in calling attention to the existence of the complications, and in regard to their treatment.

These forms of pneumonia, as I have said, are secondary to the apoplectic state, the result either of the vaso-motor disturbance arising from the cerebral lesion or the cardio-vascular disease which causes the apoplexy, or of the stupor which permits the

invasion of the bronchi and lungs by foreign substances and micro-organisms. They would not develop without the apoplexy, and apoplexy of course may cause death without any pulmonary edema or broncho-pneumonia. Nevertheless some cases might recover from the apoplexy, did not the broncho-pneumonia add to the danger.

Such being the case, one of the chief aims in the treatment of the apoplectic state should be to prevent the development of broncho-pneumonia. Various factors combine to produce the condition, all of which must be considered in the treatment. The circulation is impaired, causing stasis in the lungs, the fluid, by the action of gravitation, seeking the dependent portions. By reason of the shock and of the paralysis, the movements of respiration are lessened, so that the fluid is not forced out from the lungs. On account of the stupor, there is lessened reflex sensibility of the pharynx and larynx, so that the patient rarely coughs. Mucus, food, and the normal microörganisms of the mouth, collect in the throat and are gradually carried down into the lungs. The need of air from the diminished movements of respiration, causes the stuporous patient to breathe through the mouth, thus affording ingress to the organisms floating in the air. All these factors act together to promote the development of broncho-pneumonia in which hypostasis and inhalation play a part in varying degrees.

To combat these various pathogenetic factors, therefore, therapeutic measures should be undertaken with four different objects in view: oral asepsis, stimulation of the circulation, stimulation of respiration, and counteracting the action of gravity.

The necessity for oral asepsis admits of no dispute. Care in the administration of food, frequent and thorough swabbing out of the mouth with mild antiseptic solutions and the use of antiseptic douches or spray in the nostrils are all of advantage, although complete asepsis can hardly be attained.

Stimulation of the circulation by drugs is a measure attended with some danger and has seldom seemed to me very efficacious. Over-stimulation may increase the hemorrhage in the brain in the early stages of apoplexy, especially if drugs be given which tend to increase the blood pressure. Digitalis, ammonia, camphor and the like, given with drugs that lower the blood pressure, do no special harm, and sometimes seem to aid.

Stimulation of the respiration by general hydrotherapeutic measures is often not feasible, but the production of sudden, deep inspirations by the application of ice to the back or the epigastrium, or at times by cold douches, is sometimes helpful.

In this connection a word should be said of the very great benefit which may sometimes be obtained by venesection, where the patient has labored respiration, a full pulse, high blood pressure and marked pulmonary engorgement. The removal of eight or ten ounces of blood from the arm occasionally has a most dramatic effect in relieving the symptoms, even though it may not prevent the fatal issue.

One of the important indications for the prevention or alleviation of pulmonary disturbances is to counteract the effect of gravity by frequent changes of position. There are still many who urge that after an apoplectic shock, absolute rest should be enforced, arguing that even turning the patient in bed may cause an increase in the hemorrhage, and recommending that he be not removed from the place where the shock occurred, but be put in a bed made up on the floor. Others, recognizing the danger of pulmonary trouble, advise frequent changes of position from the first. I have seen many patients flat on their backs in bed, the head scarcely raised from the mattress by a thin pillow, and sometimes even lower than the body, the mouth open, the respiration stertorous and labored, the nurse scarcely daring to disturb him to swab out the mouth, and certainly not daring to lift the head enough to give drink or medicine. Such a condition is most favorable for the production of inhalation pneumonia and should never be permitted.

The danger of causing an increase in the hemorrhage by changing the patient's position seems to be about as great as the danger of causing delirium tremens in a case of marked alcoholic stupor by cutting off alcohol. It is my custom to have the upper part of the body raised up in bed, with the head fairly high; to turn the patient from side to side frequently, and, when the lung conditions seem threatening, to get the patient out of bed in a day or two into a chair for a short time, at least once each day, fastening him into the chair if need be. If there be a hemorrhage still going on, the ordinary laws of physics should convince us that less blood will flow out into the brain when the head is higher than the body, than when the head is nearly on the same level. I have

seen no harm from such treatment. Many patients die with some
signs of increasing coma, but they show no change as a conse-
quence of moving. Other cases may show improvement, like that
often seen in getting a patient stuporous from a fractured skull
or an alcoholic " wet brain " up in a chair.

Out of the one hundred and twenty fatal cases cited, four
succumbed to a second shock while in the hospital. In three
cases, however, the second shock did not come soon after the
first, while the patient was being moved in bed or taken out of
bed and put in a chair. It came several weeks later, when the
patient had recovered from the first shock and the hemiplegia had
improved so much that he could move about. Then, when mak-
ing some slight voluntary effort, the second and fatal shock came.
Some cases, too, who at first show no signs of broncho-pneumonia,
may regain consciousness and improve. In a few days they grad-
ually grow more stuporous and die with evidences of trouble in
the lungs. The cause of this change for the worse is not always
clear. Some have been kept quiet and not subjected to any special
change of position that would bring on a fresh hemorrhage, nor
has an autopsy shown any new focus of disease to explain the
increase of symptoms. At all events the change in position can-
not be held responsible.

I do not claim that broncho-pneumonia can always be prevented
by the various methods of treatment mentioned above. The pres-
ence of râles is of grave significance, but their occurrence is
merely a consequence of a still graver affection, the shock itself.
These methods of treatment often fail to relieve the condition.
In some cases, however, the patient might recover, but for the
added burden of pulmonary complications, and, if treatment can
pull even a few of such patients through, it should not be ne-
glected. The methods are neither new nor original. Various men
in this country and abroad have advocated them. Many of us,
probably, have repeatedly put them in practice. In view, how-
ever, of the slight attention paid to the whole matter in many of
our text-books, and the insistence upon absolute rest and the fail-
ure fully to consider the treatment by many authors, it has seemed
to me worth while to call attention once more to the frequency of
these complications and the best methods for their prevention.

Society Proceedings

THE PHILADELPHIA NEUROLOGICAL SOCIETY

OCTOBER 23, 1914

The President, DR. CHARLES K. MILLS, in the Chair

Dr. W. B. Cadwalader presented a case of facial hemiatrophy greatly improved by the administration of thyroid extract.

Dr. F. X. Dercum said that it was of interest to recall that thyroid extract is often of value in scleroderma and Dr. Cadwalader's case was initially a scleroderma, or morphea. There can be no doubt that diffuse scleroderma and facial hemiatrophy are closely related diseases.

Dr. Alfred Gordon asked Dr. Cadwalader whether he had found changes in the electrical reactions in his case, and, if so, what the electrical reaction consisted of, and what was the degree of improvement that followed the treatment with thyroid.

Dr. Augustus A. Eshner said he would venture to anticipate what Dr. Cadwalader might say in reply to Dr. Gordon by stating that he had seen the patient a good many times at Dr. Mitchell's clinic in the Orthopedic Hospital, and that there was no question as to distinct improvement. When the patient first came the left side of the face was smooth and the skin parchment-like in appearance. Under treatment with thyroid extract, carefully controlled, the skin has become softer and the face more mobile. There has been no loss in weight. The atrophy of the face, naturally, still persists. The patient herself is aware of the improvement that has taken place and she agrees subjectively with the impression that she had gained.

Dr. Cadwalader said in reply to Dr. Gordon's question, that there was a quantitative diminution of the electrical reactions—but reaction of degeneration was not present. Dr. Eshner had already answered the question as to the amount of improvement which had taken place. There was no doubt that the patient had improved, but she is by no means well, though decidedly better than before treatment had been undertaken.

Dr. T. Maxwell Langdon presented a patient with a peculiar form of hippus in tabes.

Dr. Tom A. Williams said that he had a case of tabes with partial optic atrophy some three years ago and gave salvarsan without any detrimental effect to the optic nerve, however, without much effect on the patient. The vision was not so defective as in the patient shown, but the man also had dilated pupils and a hippus. There was a distinct hippus without complete optic atrophy.

Dr. Spiller said he had not seen a pronounced hippus as a sign of tabes as in the case Dr. Langdon had shown. He had often seen contraction of the iris with rapid dilatation again. Fry, of St. Louis, read a paper before the American Neurological Association a few years ago

in which he spoke of the rebounding pupil. That may be a sign of tabes, and may precede the Argyll-Robertson pupil.

Dr. C. W. Burr presented a case of multiple neuritis with marked hysterical ataxia.

Dr. Tom A. Williams said Dr. Burr's case was a good illustration of Babinski's contention that suggestion which leads to hysteria is most commonly provoked by some physical disease. This man was a beautiful example of a paralysis followed by an imaginary one of a different type.

In discussing Dr. Burr's patient, Dr. D. J. McCarthy stated that he would add a correction of the notes of the case. His recollection was to the effect that the man had been admitted to his wards during the summer, that the knee jerks were lost on the entrance of the patient to the nervous ward. The case was unquestionably one of multiple neuritis. The arm reflexes were retained, but later the neuritis extended to the upper extremities with loss of reflexes in the upper extremities. The patient was in bed, in a helpless condition with paralysis of both lower extremities at the time.

A CASE OF FRIEDREICH'S ATAXIA

By James Hendrie Lloyd, M.D.

Dr. Lloyd showed a patient with Friedreich's ataxia. The patient was a young man whose chief symptoms were ataxia and a characteristic deformity of the feet—a form of pes equino-varus, with over-extension of the great toe, very similar to that shown in the picture originally published by Brissaud. The knee-jerks were abolished, and the Romberg symptom was well marked There were, however, no Argyll-Robertson pupils, no sensory disturbances, no eye-ground changes, and no fulgurant pains. On the other hand, there was no nystagmus or speech defect—which, of course, was somewhat against the diagnosis of Friedreich's disease. In this connection Dr. Lloyd spoke of the possibility of atypical forms. The Wassermann test was negative, as were also the other tests on the cerebro-spinal fluid. The case was of additional interest from the fact that it had been reported by an advertising charlatan as a cured case of genuine locomotor ataxia.

In reference to the case presented by Dr. Lloyd, Dr. Spiller said it occurred to him while Dr. Lloyd was presenting the patient that there was another diagnosis possible, and the case might be one of the Charcot-Marie-Tooth type. The man had very small wrists comparable with the upper limbs, and small ankles comparable with the legs and thighs. He had no tendon reflexes.

Dr. Lloyd, in speaking of his case, said he believed the only suggestion made was the one by Dr. Spiller, who thought the case might be referred to the Charcot-Marie-Tooth type. Dr. Lloyd thought the objection to that was that the man has no muscular atrophy. In the Charcot-Marie-Tooth type we have really a form of peripheral multiple neuritis, or progressive multiple neural degeneration. There is not only muscular atrophy in such cases, but there may be fibrillation, and the extensor muscles are especially affected, so that the patient has foot-drop and the so-called turkey gobbler gait. This boy has not got this. Dr. Lloyd called attention to the fact that the patient has no nystagmus and no speech defect, which was against the diagnosis of

Friedreich's ataxia. It is not a familial case. One of the best cases at Blockley, however, is in a man whose history is not familial.

EXTRAPYRAMIDAL HEMIPLEGIA

By Alfred Gordon, M.D.

The patient, male, 25 years old, had at the age of eight an attack of left hemiplegia with aphasia. The aphasia disappeared at the end of several weeks. A year later the following peculiarity was noticed. Gradually a contracture developed in the wrist and foot, and a tendency of the arm to become everted at each movement was noticed. At present the patient shows the following condition:

There is a certain weakness in the left arm and leg, but no actual paralysis. He can voluntarily move every joint of the affected limbs with the exception of the wrist and ankle. On passive movements no resistance is felt, and at times hypotonia is noticeable. On motion an extreme contracture of the fingers and toes, wrist and ankle makes its appearance. Besides, the arm becomes then everted. At the same time an associated contracture is observed in the muscles of the neck, face and ear on the left side. The knee-jerks are exaggerated on both sides; there is no ankle-clonus and no toe phenomenon by any of the well known methods. No sensory disturbances. Bladder and rectum are normal. No visceral involvement. Mentality is normal. The face shows an atrophic condition on the left and its musculus frontalis is paretic. The eyes are normal. Urinalysis, blood examination and Wassermann test are all negative. Dr. Gordon discussed the differential diagnosis between this form and the classical organic hemiplegia, and also compared it with hysteria, dysbasia musculorum deformans and Wilson's lenticular degeneration. After demonstrating the differential features he arrived at the conclusion that it is a case of extrapyramidal hemiplegia, a new clinical entity. Its essential features are: Unilaterality; no actual paralysis, but a certain amount of disability due largely to the contracture; increased knee-jerk, but no toe phenomenon; preservation of voluntary movements; extreme contracture upon the least passive or voluntary movement; preservation of abdominal and cremasteric reflexes on the affected side; inclination of the trunk towards the affected side when walking; atrophic condition of the entire affected side including the face; clonic contractions of the muscles of the face on the affected side; preservation of sensation.

Dr. Spiller said Dr. Gordon stated that the man's paralysis came on in typhoid fever. That is not unknown. Dr. Spiller had had such cases, and Dr. E. M. Williams reported three such cases under Dr. Spiller's observation. The lesion usually is thrombosis.

The case presented by Dr. Gordon Dr. Spiller regarded as belonging to von Bechterew's postapoplectic hemihypertonia. Dr. Spiller had published a paper on this subject with the description of a case in the *Philadelphia Medical Journal,* December, 1899. He believed Dr. McCarthy also had reported a case.

Dr. Tom A. Williams stated that the attitude of Dr. Gordon's patient resembled that seen in athetosis if the movement were absent. When it is remembered that athetosis occurs only as the result of prenatal or natal lesions, an explanation of this patient's syndrome suggested

itself in the comparison of extrapyramidal paralysis in the paraplegia of the aged, with or without pseudo-bulbar symptoms, for in them there are never athetoid movements, whereas in the extrapyramidal paralyses occurring before birth, athetosis is common. As the onset in this case was at the age of eight, we find in addition the "marche aux petits pas" and timorous walk of the aged, the attitude of the wrists such as occurs in infantile cases, but without the movements they show.

Dr. Mills said that Dr. Gordon's case was not one of ordinary typhoidal hemiplegia, but rather one of hyperhemitonia. Dr. Gordon's opinion regarding the cite of the lesion and the character of the case seemed to be correct in the light of recent views regarding the functions of the lenticula. Dr. Mills said that it was well-known to the members of the society that he had presented a paper on emotional expression, muscle tonicity and the cerebral tonectic apparatus at the meeting of the American Neurological Association in May, which paper should have appeared before this in the Neurologisches Centralblatt, but it had been held up for some time by circumstances concerning the war in Europe. He would only recall that in his opinion the cerebral tonectic apparatus was extrapyramidal and quite separate from the pyramidal system although intimately connected with the latter by cortical and by strio-rubro-thalamic tracts. Tone rendezvoused in the cortex of this extrapyramidal tonectic apparatus was, so to speak, delivered upon the motor (pyramidal) tracts and it was in this way that muscle tonicity could be accounted for best. Atonia, hypotonicity, hypertonicity and irregular tonicity all might result from lesions of the pyramidal tracts, but this was because of the effects which lesions of this kind had on the reception and delivery of tone and impulses from the cerebral tonectic apparatus.

Dr. Alfred Gordon said he was very glad to hear the remarks of Dr. Spiller and Dr. Mills and Dr. Williams. The hemihypertonia mentioned by Dr. Mills was, of course, present in the man. That was one of the symptoms of the condition the patient presented. As Dr. Mills mentioned, it is the absence of the toe phenomenon which would point to an extrapyramidal lesion. To Dr. Gordon's knowledge no autopsies have been as yet performed in cases of that kind. He would by analogy with Wilson's disease locate it in the lenticular region. Dr. Gordon said he would like to get information with reference to the involvement of the upper portion on the left side of the face, as there is a paresis of the frontal muscle. He believed that we are justified in considering this condition as an extrapyramidal hemiplegia. While it is not a true hemiplegia, nevertheless cases of that kind could be called extrapyramidal hemiplegia. The case was interesting to him because it was quite novel and goes hand in hand with Wilson's disease, except only that it is only on one side. Dr. Gordon said that perhaps he had given the wrong impression in reference to the occurrence of organic hemiplegia in typhoid fever. Several years ago he exhibited before the County Medical Society cases of hemiplegia occurring in typhoid fever. He did not mean to intimate that they are rare, although they are not frequent.

Dr. William Drayton and Dr. T. Maxwell Langdon presented a case with lost tendon reflexes and Argyll-Robertson pupils and no other signs of tabes.

Dr. F. X. Dercum and Dr. Willis F. Manges presented an interesting case of brain tumor; localization by means of x-rays.

Dr. D. J. McCarthy in discussing Dr. Dercum's paper wished to place on record a man with syphilis and multiple sclerosis where the x-ray picture showed, apart from the multiple sclerosis, a lesion very much like that in Dr. Dercum's case in the occipital lobe. Dr. McCarthy decided that this tumor had absolutely nothing to do with the general symptom complex of the case. Therefore nothing was done.

Dr. Tom A. Williams spoke of a case under his care where a large growth on the vertex both bulged outwards and inwards, causing deformity, headache, and mental obtusion. The Roentgen rays showed that the growth extended at least an inch below the inner table. When removal was attempted the hemorrhage was so great that the surgeon had to cease. The portion excised resembled osteoangiosarcoma. Therapeutic application of Roentgen rays has caused subsidence of the headache and mental obtusion, the improvement has lasted six months but treatment is continued.

Dr. S. D. W. Ludlum said he was reminded of a case of Dr. Lloyd's at the Methodist Hospital with a tumor at the seat of the pineal gland. It had caused a great deal of trouble. It was equally well seen in the x-ray picture. It was a psammoma.

Dr. Spiller said in regard to Dr. Lloyd's case it was not surprising that the tumor photographed so beautifully as it was filled with corpora aranacea, and it had been difficult to make sections of it.

NEOPLASM INVOLVING PITUITARY AND SELLA TURCICA TREATED BY "X" RAYS

By Tom A. Williams, M.B., C.M., Edin., Washington, D. C.

A West Virginia woman, aged 37, was referred to Dr. Williams on July 28, because of severe central headaches which had followed a convulsion five months previously. During this period, several convulsions followed by stupor, nausea, extreme dizziness and vomiting occurred now and then; and a diplopia had existed for two months. Her greatest distress, however, was occasioned by the indescribably "awful" feeling, which was constant, and accompanied by a bad taste, she herself saying that this had been present since the death of her mother a year before, and that she had been very nervous and shaky also. She had sharp pains in the calves, felt a weight in the stomach and vague pains all over her at times, and had been losing hair very rapidly. Mercury and potassium iodide had been given for some weeks on account of the history of labial sore six years previous.

Examination showed no diplopia, although she had a blurred feeling in the eyes, a slight haziness of the optic papilla, the arteries of which were very small, and inversion of the visual fields, great exaggeration of the deep reflexes without any diminution of the cutaneous reflexes, great weakness more especially in walking, which was quite unsteady; muscular hypotonia, and subcutaneous hyperesthesia upon deep pressure. The intensity of the headache and the absence of localization symptoms and papilledema, in conjunction with the subcutaneous hyperesthesia and the "awful" feelings, led to the suspicion of pituitary involvement. So the glucose toleration test was undertaken; whereupon it was dis-

covered that from 300 grammes of glucose ingested while fasting no sugar was obtained in the urine. Thereupon the cranium was examined by the Roentgen rays. The plate showed serious erosion of the clinoid processes before and behind, and considerable erosion of the rest of the wall of the sella turcica.

The diagnosis of a growth involving the pituitary body, seemed certain. The treatment adopted was the application of heavily filtered Roentgen rays from a hard tube.

The result was that August 27 the patient felt stronger, walked much better, the blurring of the eyes had diminished, headache was inconsiderable; but the retinal arteries were still over-small, the right disc seemed less clear, and the reflexes continued exaggerated; the visual field had improved. She was sent home for three weeks with the advice that the treatment should then be resumed.

On her return, September 27, she reported that she had felt restless a good deal of the time, had occasional sudden burning sensations throughout the body, and had an almost constant throbbing which she referred to the womb; she had been very nervous and languid, and now and then the eyes felt dim; there had been a beating sensation in the occiput, worst in the morning; her appetite, however, had become good, and the headaches had disappeared.

Examination upon different occasions showed great improvement of muscle tonus, still more exaggerated reflexes, and the blood pressure varying between 130 and 140, with rapid pulse running as high as 138 at times; slight pallor of the left optic papilla without any blur. The visual fields had slightly extended. Her suggestibility was greatly exaggerated so that she was very easily upset by depressing ideas. She was then given pituitary substance, 5 grains twice daily, in the belief that some of the vascular symptoms might be favorably influenced. There is, if anything, an aggravation of the symptoms, and some nausea and further contraction of the visual fields have occurred. Dizziness and pain in the precordia troubled her a good deal, although the pulse was reduced to 90. She is now undergoing the third course of Roentgen ray application.

Dr. Dercum asked Dr. Williams whether his patient had not a preservation of vision and called attention to the fact that Dr. Langdon's patient had no perception of light.

Dr. Charles M. Byrnes read a paper on the intradural administration of mercurialized serum in the treatment of cerebrospinal syphilis.

Dr. F. X. Dercum believed it would be a good plan to try the mercurialized serum and he was glad indeed that a beginning had been made and that Dr. Byrnes had actually achieved results. Dr. Dercum had himself suggested a somewhat similar procedure.

Dr. Ludlum said the same question comes up in relation to intraspinal injection of mercurialized serum as of salvarsan. Why not inject 1/50 of a grain of bichloride directly. Why use the serum? That is a much mooted question but he had never seen it answered satisfactorily.

Dr. Gordon said he had had experience with salvarsanized serum. It is the only treatment he has relied upon lately in nervous syphilis. At the present time in a period of 16 or 17 months his results have been very satisfactory. He cited one or two cases which recently were under his care and which he proposes to put on record. One a musician, a leader of an orchestra in a theater, presented no marked symp-

toms, but just sufficient to make a diagnosis of tabes. He had eye symptoms, loss of knee jerks and of Achilles tendon reflex and some ataxia. Paresthesia in the hands especially annoyed him, so that he could not feel the violin strings that he had to press upon with the finger. He had to give up his occupation for several months and was much distressed. When he came under Dr. Gordon's observation the above treatment was proposed. The musician submitted himself, and it was actually remarkable how the paresthesias gradually and rapidly disappeared and he resumed his occupation. After six weeks a return of knee jerks was observed. In another patient, a locomotive engineer, who suffered sharp, shooting pains in the legs, Dr. Gordon obtained complete removal of the pain in five weeks. The salvarsanized serum he has been using continuously. With one exception the results have been prompt, the paresthesias and subjective disturbances, in particular, have been helped considerably. Dr. Byrnes reports one case in which he said the salvarsanized serum had been used first and this was followed by addition of mercurialized serum. Dr. Gordon believes the salvarsanized serum is an excellent remedy, and it is possible that the addition of mercurialized serum will help the condition. He would like to know how long would Dr. Byrnes have the inunctions or injections of mercury used before he gets the serum. How much mercury he uses before he begins to utilize the mercurialized serum. It is possible that the association of salvarsan and mercurialized serum will give still better results. Salvarsanized serum had been in Dr. Gordon's experience one of the most excellent, if not the best, remedy.

Dr. Williams said he would draw the attention of the Society to the fact that we do obtain excellent results by the treatment of tabes by intravenous injections of salvarsan combined with intravenous and intramuscular injections of mercury. We must not forget the report to the American Neurological Association by Dr. Sachs and Dr. Stearn, who treated by intravenous salvarsan plus mercury, about 137 cases with almost constant benefit.

Dr. Williams has about 60 patients similarly treated, most of whom are functionally well. Many of these are controlled by lymphocyte counts. As the disease was deeply seated in the membranes and the lesions were chiefly around the vessels, access of medicaments must be from the blood and lymph rather than from the spinal cord; besides arsenic is inappreciable in the serum as injected intrathecally by Swift-Ellis technique, while arsenic is found in the ventricles after intravenous injections.

Dr. Charles M. Byrnes in answer to the question why he did not use an inorganic salt, replied that this was best answered by stating what he had abstracted from a paper by Ravaut The author injected two drops of a 1 per cent. solution of the cyanide of mercury. The result was that the patient had severe muscular spasms of the entire body, and trismus was pronounced. After a few days these symptoms subsided. Dr. Byrnes is of the opinion that the serum preparation is less irritating than the inorganic salts of the heavy metals. In regard to Dr. Gordon's question, he replied that he had had several cases in which the combined serum was used, but did not refer to these cases because of the limited time at his disposal. He is convinced, however, that the mercurialized serum produces a quicker reduction in the cell count in the spinal fluid than salvarsanized serum, and the negative Wassermann

reaction has been obtained in about an equivalent percentage of cases. He does not wish to give the impression that he is not enthusiastic about salvarsanized serum, for he has found it quite effective in many instances, but there are certain cases in which the mercurialized serum is perhaps more valuable.

INVOLUNTARY MOVEMENTS FOLLOWING BILATERAL CEREBRAL LESIONS

By Douglas Davidson, M.D.

The patient, a man 28 years of age, was exhibited for Dr. Spiller, under whose care he was. He had had a rapidly developing left hemiplegia in June, 1914, and after this his mentality was affected and he was childish. The paralysis gradually disappeared. In August, 1914, he had had a second attack in which the right side of the face probably was weak. Following this attack he developed almost purposive movements of all four limbs and involuntary laughter.

When he came under Dr. Spiller's observation he was fairly contented and did not worry about his condition. He answered questions intelligently. When at rest and unobserved, his face was not contracted, but any observation of him, noticed by him, caused a marked spastic smile to appear, which at times became an audible laugh. Speech was slow. The face and limbs on the left side seemed to be a little weaker than on the right side, and the tendon reflexes were somewhat exaggerated. The man was presented chiefly because of the peculiar involuntary movements. When he was at rest these movements were not pronounced, but under observation he performed slow, deliberate, regular to and fro movements of the feet, rubbing the feet along the floor, first pushing one or the other forward and then drawing it back, sometimes giving either foot a sideward motion, or tapping on the floor with the toe or heel. He was unable to control these movements. He had similar movements in the upper limbs; he picked at his coat or trousers, or shrugged his shoulders. He seemed to be under great motor stimulation, as though cerebral inhibition had been greatly diminished, and his movements had a purposive character.

Dr. I. Jones thought the ear situation in this man was a very surprising one. As he understood it the examination of the ear was suggested by the fact that he was deaf; a wax plug was removed from one ear and hearing was completely restored. Examination shows a very excellent degree of hearing on both sides. If it were not for the examination of the vestibular apparatus the ear would be entirely eliminated in this case except negatively. To his astonishment the vestibular apparatus of each side is noticeably impaired and the right is practically dead to the caloric reaction. Definitely speaking, when water 68° was douched into his right ear for four minutes and 25 seconds (until the entire amount of water in the irrigator was exhausted), it failed to produce nystagmus or any deviation in the pointing reactions. If his arm were brought down from above or to the side it would touch every time just as it would spontaneously, if no impulse were carried through. This was done repeatedly on successive days. On the second day after 2 minutes and 25 seconds, a slight result was obtained, whereas a result ought to be produced in 50 or 60 seconds. (A nystagmus should be obtained to the opposite side and a pointing reaction

towards the same side). There was produced at this time the very faintest rotary nystagmus, which could not be observed at all unless he were watched closely and just the least little twitching could be seen. His pointing reactions went the least little bit towards the right, perhaps an inch, nevertheless he distinctly reacted toward that affected side. The left ear showed a more marked nystagmus in 1 minute and 35 seconds, and gave no very marked pointing reactions. All this was observed in a man without any dizziness. It is difficult to reconcile these findings of an obstruction along the line of the vestibular apparatus with a lesion of the lenticular nucleus.

Dr. William G. Spiller said that the case was one of much interest to him. Wilson speaks of an acute onset, in rare instances, of the progressive lenticular degeneration. In Dr. Spiller's case the lesion is not progressive. The disorder is not a family one, but this does not exclude it from Wilson's type. There must be bilateral lesions, one of the lesions may be in the center for the facial muscles and the other near the internal capsule. The symptom-complex is distinctly different from that described by Wilson. The movement is not a tremor. Dr. Spiller had a number of times observed this man when the man did not know any one was watching him, and at such times he was quiet. It seemed as though the movements were caused by some emotional disturbance as a result of removal of inhibition of the brain, so that any excitement caused these unintentional, yet almost voluntary appearing movements.

Dr. Mills remarked that he had studied the patient, not as fully, of course, as Dr. Spiller had, and it seemed to him the case was much as Dr. Davidson and Dr. Spiller presented. He had some little tremor also. He showed it sometimes in his tongue. The movement is similar to that described in some of Wilson's cases. While he has no spasticity, Dr. Mills did not think the tonicity of the muscles was absolutely normal. He had a distonicity. In fact, the term hypertonicity was not the very best, although so much used in these cases. His speech was somewhat dysarthric, his mental condition was like that in Wilson's disease.

The movements of this patient remind Dr. Tom Williams of the " forme fruste " of " movement de manège " seen in animals after extirpation of the vestibule; it is as if the patient is about to turn round to one side when the movement is immediately interrupted by the impulse to turn round in the other direction, with the result that he keeps advancing and drawing back one foot and hand after the other, accompanied by a swaying. In conjunction with the other symptoms, it might be that a bilateral lesion implicating the trapezoid body is responsible; for this tract conducts some of the vestibular impulses.

INTENSE JAUNDICE IN THE NEWBORN CHILD AS A CAUSE OF ARREST IN THE DEVELOPMENT OF THE BRAIN

By William G. Spiller, M.D.

Dr. Spiller said he had had four cases of cerebral diplegia with the history of intense jaundice occurring a few days after birth. The ordinary mild icterus of the newborn could not be considered, but in some cases the icterus is severe and it is possible that the cortical nerve cells

might be affected by the intoxication occurring with the jaundice. He had found no mention in literature of severe jaundice as a cause of cerebral diplegia, and he thought it desirable to call attention to this cause. The subject was presented only in abstract form and the paper will be published later.

Case 1.—Child, three years old when seen, was born at full term in normal labor. She was supposed to be a normal child until severe jaundice developed when she was one week old. She probably was unconscious during this attack. The jaundice lasted three days. She was unable to hold up her head until a year old, and unable to rise to a sitting position when lying down until three years old. When examined she presented the appearance of spastic ataxic diplegia.

Case 2.—Child, sixteen months old, was possibly born a little prematurely, in normal labor. Severe jaundice began on the fourth day and lasted about six weeks and the child nearly died. When recovering from the jaundice the head frequently was drawn backward. He had spastic cerebral diplegia when examined.

Case 3.—Child, two years old, was born at full term in normal labor. Severe jaundice developed a few days after birth and for weeks the child was not expected to live. The condition was one of delayed development with hypotonia of the neck muscles.

Case 4.—Child, three years and ten months old, was born at full term in normal labor. Severe jaundice began on the third day and lasted about three months. The condition was one of marked spastic cerebral diplegia.

Dr. McCarthy said he thought this paper of Dr. Spiller's was an important contribution to the subject of cerebral defects and brought to mind some work along these lines that he did some years ago, working out metabolic changes and more particularly the osmotic changes. He did some experiments with rattlesnake venom. A condition of hemolysis developed, associated with an infiltration of iron in the ganglion cells in the cortex.

Dr. Gordon said that if this jaundice was of a hemolytic nature, it is possible that multiple hemorrhages took place in the cortex which subsequently produced softened foci in the cortex, thus causing the arrest. He did not know whether Dr. Spiller had an autopsy or not. That was one of the ideas that came to Dr. Gordon that could explain the encephalic arrest by a pure mechanical process.

Dr. Spiller said in regard to the action of jaundice in the newborn, hemorrhage probably does occur in some of these cases and acts mechanically. He had referred to this in his paper.

COMBINED MEETING OF THE NEW YORK NEUROLOGICAL SOCIETY AND THE NEUROLOGICAL SECTION OF THE N. Y. ACADEMY OF MEDICINE

November 10, 1914

Dr. Smith Ely Jelliffe, President of the N. Y. Neurological Society, and Dr. I. Strauss, Chairman of the Neurological Section of the N. Y. Academy of Medicine, presiding

SCLERODERMA, WITH CONTRACTIONS

By S. P. Goodhart, M.D.

The patient was an unmarried girl, 24 years old, a Hungarian Jewess, whose family and previous personal history showed nothing of interest. Her present illness began about nine years ago, when she noticed a swelling of the toes, followed by increasing stiffness of the toes and knees. About the same time she also complained of a feeling of coldness and weakness in the lower extremities, with paroxysmal attacks of whiteness of the skin of the hands, together with pain and tingling. With the disappearance of the blanching, the hands would become congested and then cyanotic. Because of the increasing weakness the hands lost in function, and flexure contractures soon appeared. These symptoms for a time increased in severity and then remained stationary.

About five and a half years ago the patient noticed pigmentation of the chest and a peculiar stiffness of the face, so that she was scarcely able to open her mouth. Some months later there was some improvement in the power of moving the knees and toes. When the weather was cold she had noticed a numbness of the nose and tongue, but not of the lips nor ears.

The legs could be separated for a distance of only about six inches at the knees, due apparently to fixation at the hip joints. Over the feet there was a hidebound condition, but less marked than in the hands, which presented the typical appearance of a pronounced sclerodactyle. The face was distinctly masked in character, with all lines obliterated: the palpebral fissures were wide, giving a strange expression to the eyes. The margins of the lips were very narrow, and the mouth was held stiffly and always partially open, giving rise to a mummified expression. The nose was narrow and angular. The ears, which were indurated, thin and blanched, were held rigidly down. The mucous membrane of the mouth was becoming involved, showing some induration to the touch. The scalp showed no abnormality. The mammæ were fairly well developed. Trophic disturbances were well marked over the small joints of the fingers and toes. The skin showed glossiness as well as the pigmentation. Many scars were present, due to previous ulcers of the fingers and toes.

Sensation.—A few years ago there was a slight but manifest diminution to painful stimuli from the finger-tips up to the wrists; this was also true of the feet and ankles. At the time of examination no sensory changes were found excepting that there was a lack of proper appreciation of hot and cold stimuli.

Dr. Goodhart said the interesting features in this case were the initial symptoms, which pointed strongly to Raynaud's disease; indeed, that was the original diagnosis and the one with which the patient was discharged

from the Harlem Hospital. Further, the case offered a recognition of the various stages of the disease, so far as it affected the soft tissues, namely: edema, induration and atrophy, and the characteristic cutaneous pigmentation. The restriction in the movements of the joints was by no means entirely due to the hidebound condition: there were true changes in the joints giving rise to ankylosis. The hip joints were so restricted by the intra-articular pathological process as to afford very little movement to these joints. There was doubtless rarefaction and absorption of osseous tissue in some of the larger joints analogous to the atrophic process of the subcutaneous tissue.

There had been periods of marked improvement in the condition of this patient, and for a time the administration of thyroid extract seemed to be responsible for it. The initial symptoms affecting the periphery of the extremities and suggesting Raynaud's disease, together with the dissociated sensory changes, indicated a trophoneurosis. An interesting symptom in this case was the beginning involvement of the mucous membrane of the mouth. The vaginal mucosa had not been examined.

Dr. Goodhart said he did not believe that the pigmentation in this case was really indicative of adrenal involvement, there being no other symptom of Addison's symptom-complex.

Dr. Walter Timme thought this condition was one of generalized connective tissue hyperplasia, of which the scleroderma was only a single manifestation. This connective tissue hyperplasia, in turn, was secondary, as a rule, to a disturbance of the sympathetic and autonomic nerve supply. In most of these cases of scleroderma we get the history of an antecedent high grade sympathicotonia, and as this increases we begin to get the tissue hyperplasia, sometimes in the muscles and joints, and occasionally in the thyroid, the hypophysis cerebri and blood vessels. We have an overactive sympathetic and an underactive autonomic system. In the end, it probably resolves itself into a question of disturbance of the internal secretions, and from a therapeutic standpoint we had seen some benefit from the use of various internal secretions. These must be brought to bear upon the particular symptom that was in the foreground, and it required a good deal of application and patience to arrive at any result. Many of the symptoms of these patients, such as the lack of perspiration, the occasional rapid pulse, etc., went to prove the contention that the condition was due to a disturbance of balance between the sympathetic and autonomic nervous systems.

In reply to a question as to whether he regarded the lesion in the case shown by Dr. Goodhart as cortical or subcortical, Dr. Timme said it had been shown that the ablation of one of the hemispheres gave rise to certain sympathetic manifestations, but just what part of the hemisphere was involved we did not know. The highest level to which they had been traced thus far was in the region subjacent to the corpora quadrigemina, to the hypothalamus, to the stalk of the hypophysis and some of the centers of the vagus. Manifestations of the autonomic system had been found in hypophysis stimulation.

Dr. Goodhart, replying to Dr. Timme, said that in spite of the lack of pathological evidence, the clinical evidence seemed to be very striking of a higher center, probably about the motor area.

A CASE OF DYSTONIA MUSCULORUM PROGRESSIVA

By H. Climenko, M.D.

A girl, eleven years old, born in Russia of Jewish parentage, was admitted to the Montefiore Home on September 27, 1914, with the following history: Her father, who was 43 years old, was not addicted to the use of alcohol and smoked moderately. Fifteen years ago he had an attack of acute articular rheumatism. He denied any venereal infection. The mother was healthy. She had had one miscarriage and four children at full term, who were living and in good health.

The parent, who was the third child, was born at full term after a perfectly normal labor. She was breast fed and began to walk and talk at about the age of eighteen months. The first tooth was erupted at five months. She had German measles when she was two years old and a year later had two attacks of tonsillitis. When she was nine and a half years' of age she had an attack of whooping cough. The bowels had always been irregular; her appetite was poor and she was frequently restless in her sleep. She played a good deal out of doors and was considered bright at school.

About a week or two after the attack of whooping-cough, *i. e.*, about eighteen months prior to her entrance to the Montefiore Home, she began to complain of weakness in her left lower leg. A little later she noticed that the foot turned outward while running or walking quickly. The weakness gradually extended upward, and her knee gave way. Plaster-of-Paris was applied to the knee joint, which seemed to have relieved her a good deal. A few weeks later she began to complain of weakness in the opposite leg, and soon the left hand became involved, and with each attempt to use the hand it began to tremble. Similar tremors were also noticed in the lower extremities. She complained of no pain nor paresthesias of any kind. The condition progressed steadily, and about a year after the onset of her symptoms she was no longer able to walk.

Her chief complaints at present were inability to walk, weakness in the right upper extremity and trembling of all extremities. In the recumbent posture the patient showed a slight wormlike tremor of all the extremities, more pronounced on the right side. In a position of rest, with the extremities as nearly in repose as possible, this tremor, though constantly present, was better appreciated by touch than by sight. It somewhat resembled an athetosis, but lacked all the characteristics of that movement. It seemed to possess a characteristic of its own, being somewhat irregular and wormlike, and entirely lacking in rhythm. Perhaps the word dyskinesia most appropriately described it. In the prone position there seemed to be a characteristic pose consisting of flexion of the right knee, with extension and external rotation of the right hip, and outward rotation of the left foot. There was a slight kyphosis in the lumbar region which became more pronounced in the sitting posture. On standing, a kypho-scoliosis was equally pronounced. The trunk assumed an acute angle, with the pelvis of the latter varying in its position with movement. The patient could stand only with support. On standing, the right foot was at an unusual angle with the lower leg, the right knee assuming almost the shape of a genu recurvatum. The patient was unable to walk unsupported, a marked feature being a peculiar torsion of the trunk on the pelvis, the latter being thrown out of a normal angle rela-

tion with the trunk. On trying to walk there were numerous unskilful and disharmonious movements through extremities and trunk: to correct these movements, the patient seized her lower extremity at the joint, forcing it into proper position. She thus expended an inordinate amount of energy in attempting with her hands to facilitate locomotion, alternately pressing back one knee and then the other as the obstreperous joint gave way under the body weight.

The right hamstring muscles were in a state of hypertonicity; almost rigidity. The muscles of the right leg were in a similar condition. Both quadriceps groups and the left peroneal group were, on the contrary, in a state of complete atonia. The hips were hyperflexed on the abdomen. Due to the atony of the flexors digitorum of the right hand, the fingers could be hyperflexed to such a degree that on dorsal flexion (really extension) of the fingers, they could be brought to an acute angle with the dorsum of the hand.

Both knee jerks were diminished, and the ankle jerks were obtained with difficulty. The Babinski and Oppenheim signs were absent. The abdominal reflexes were present. All the various sensibilities were intact. The cranial nerves were normal. The heart, lungs and abdominal viscera showed no abnormality. The patient was able to write with difficulty. The electrical reactions showed no qualitative changes: a hyperexcitability, however, was obtained in the hypertonic muscles. The urine showed a slight excess of indican, but was otherwise negative. The psyche was perfect. The x-ray showed that the neck of the left femur was shorter and thicker than the right and the sacrum was turned to the left. There was no change in the density of the bone.

Dr. C. C. Beling, of Newark, N. J., said that at a meeting of this Society some time ago he presented a case bearing some resemblance to the one shown by Dr. Climenko. That was the only case he had seen. The one shown tonight seemed to be in a rather earlier stage.

Dr. I. Abrahamson said he showed a case of dystonia musculorum progressiva at a meeting of this Society about two years ago, and since then he had seen two additional cases. In the case he had presented, the disease had previously developed in the patient's sister, and these were the only instances on record, so far as he knew, of two cases in the same family.

Oppenheim, in his description of this disease, spoke of its usually beginning in the hand, the child noticing that it could only write with difficulty, the symptoms later extending to the leg, etc. In a typical case which came under his observation about a week ago at the Montefiore Home, the patient, a girl, had hypertrophy of the lower extremity which was affected by the dystonia, and from time to time there were cramplike spasms in these muscles. This hypertrophy and hypertonicity is also observed in Thomsen's disease.

The case shown by Dr. Climenko tonight, Dr. Abrahamson said, seemed to present a typical case of dystonia musculorum progressiva.

Dr. I. Strauss said that in one case that came under his observation, in addition to the hypertonicity, there was reaction of degeneration in the muscles of one leg. That patient died. No autopsy was obtained. The condition began in one arm following a trauma, and the first appearance of the tremor was in the injured arm. From here it spread over the entire body, and the child was in a constant state of spasm, so that repeated doses of hyoscine were required to keep it quiet. In this case the dystonia and lordosis were extreme.

Dr. William M. Leszynsky said that the case of dystonia musculorum progressiva which he showed at a meeting of the N. Y. Neurological Society about nine years ago was the first case of the kind presented in this country. That patient had been subjected to various forms of treatment, including tendon cutting to relax the muscular spasm, etc. At a later date he was again shown at a meeting of the Society by Drs. Hunt and Krauna. Dr. Leszynsky said that at the time he presented the patient, no diagnosis was made. There was no scoliosis, but the boy moved about on all-fours, with constant peculiar and fantastic movements. He improved for a time, but subsequently his symptoms became exaggerated.

Dr. Climenko, in closing, thought that Oppenheim emphasized the fact that there were no organic muscular changes, hypertrophy or atrophy, and that the characteristic marks of the disorder were hypertonia and atonia: these he regarded as the only cases that should come under the category of dystonia. Other writers on this subject failed to agree with Oppenheim, and cited cases in which atony was lacking.

PILOUS CEREBRAL ADIPOSITY

By Walter Max Kraus, M.D.

Many instances of genital dystrophy associated with obesity have been described since Froelich first separated the syndrome from the general class of obesities, but Dr. Kraus had not found any account of a class of cases complicated by an anomalous condition such as was presented in this case; namely, a marked increase of the body hair, accompanied by a lack of the dry skin characteristic of the classical Froelich syndrome.

This patient, in the service of Dr. Alexander Lambert, in the medical wards of Bellevue Hospital, was a white man, 31 years old; a watchman by occupation. His father was living and an alcoholic: his mother died of nephritis following childbirth. One brother died in infancy of unknown cause: one sister was living and well. Otherwise, the family history was negative. The patient had been married since 1906. His wife had had one miscarriage and four normally born children: three of these had died in infancy, one of meningitis, the others of unknown causes. The living child was two years old and well.

The patient had been accustomed to drink from five to seven glasses of beer daily up to the onset of his present illness in 1910. He smoked moderately. He gave a history of measles, chicken-pox, diphtheria and whooping-cough in childhood, and some form of arthritis from the age of 24 (1908) until one year ago. The soles of his feet were sore and later the tissues about the knees became red, swollen, hot and painful. After several of these attacks there was some limitation of motion, but one year ago, after treatment at the Metropolitan Hospital in this city, the patient was cured.

Between the ages of three and four years he fell from the fifth story of his residence to the ground, resulting, as he states, in a fracture of the crown of the skull. He was unconscious for about 14 hours and disabled for six months. From that time until the age of thirteen he was entirely well. Then he began to have attacks of Jacksonian epilepsy, which occurred from three to six times yearly and were not of sufficient severity to cause the patient to either tell his parents or seek the aid of a physician. At the age of 25, a little over twelve years after the first attack, the attacks ceased and had not since recurred.

Four years ago, at the age of 27, the patient began to grow fatter. At that time his weight was 150 pounds; in 1912 it had increased to 204 pounds; in 1913 to 263 pounds, and his weight at the present time was 282 pounds. At about the same time as this increase in adipose tissue began, the following symptoms made their appearance: his hair began to increase over the trunk and extremities, he felt sleepy and as time went on he would fall asleep involuntarily in addition to sleeping a good deal voluntarily. In 1910, while driving a large automobile beer-truck, he fell asleep, allowing the truck to run into a saloon. This accident deprived him of his chauffeur's license. These narcoleptic attacks had continued since. The patient's appetite for food, especially meat and carbohydrates, had increased. He also complained of shortness of breath and sweated a good deal. Three and a half years ago he noticed that his penis was smaller and that shortly afterwards his sexual desire grew less until now he had none at all.

Dr. Kraus said it was difficult to form any clear conception of the basic cause in this case. A fall on the head at four years of age, followed nine years later by mild Jacksonian epileptic attacks which lasted thirteen years led one to believe that some neoplasm was present. The beginning increase in the accumulation of fat two years later pointed to an involvement of the glandular hypophysis, with the probability that in the interval the glandular part was gradually decreasing in power until its limit of safety was overstepped, with the ensuing appearance of the Froelich syndrome, complicated by atypical changes in the skin and blood. The absence of any involvement of the cranial nerves or of a cranial neoplasm made it impossible to settle on any diagnosis other than hypopituitarism.

A blood examination showed 6,720,000 red cells; 10,800 white cells; polymorphonuclear neutrophiles, 56 per cent.; eosinophiles, 3 per cent.; transitionals, 1 per cent.; large lymphocytes, 10 per cent.; small lymphocytes, 11 per cent.; large mononuclears, 10 per cent.; hemoglobin, 110 per cent. (Sahli).

Urine: Albumin ranged from one to six grams per day during two weeks observation; usually about three grams. No sugar. Many granular casts and a few white blood cells.

Carbohydrate tolerance: From 100 to 500 grams of dextrose were all without effect in causing glycosuria. Seven hundred grams were followed by only a trace of sugar in the urine.

Blood pressure: Systolic, 170 mm.; diastolic, 120 mm. Wassermann negative.

Dr. Abrahamson said that in the wards of Mt. Sinai Hospital they had at the present time a young woman with very similar manifestations to those in the case shown by Dr. Kraus. She gave a history of amenorrhea, hyperidrosis, peculiar skin changes, adiposity, she complained of sleepiness, had a growth of hair on the face and body, but the urine contained sugar and showed as in Dr. Kraus's case evidences of an advanced nephritis. A blood count gave 6,100,000 red cells and 10,000 white cells, with 110 per cent. of hemoglobin. The facies looked like a typical one of polycythemia. It was noteworthy that the urine constantly contained a small percentage of sugar. The sugar tolerance was being investigated. The moist skin in this case might be attributed to the nephritis, as well as the polycythemia, but was most likely a part of the polyglandular disease. As he had not seen the x-ray plate, he could not report on the findings.

Dr. Strauss said that in the case mentioned by Dr. Abrahamson the x-ray showed an enlargement of the sella turcica which was enough to be due to a tumor.

Dr. Timme said that the hypertrichosis present in this case was not quite as generally distributed as had been stated, for upon closer inspection it could be seen that the distribution was radicular in character, and furthermore skipped the areas supplied by the cervical roots to begin again at the dorsal level. This arrangement corresponds with the position of the cells of the superior spinal sympathetic nucleus, which is non-existent in the cervical region of the cord, and begins at about the first dorsal level. This is rather suggestive, therefore, of sympathetic involvement.

Translations

VAGOTONIA

A Clinical Study

By Privatdozent Dr. Hans Eppinger and Dr. Leo Hess

of Vienna

Translated by Walter Max Kraus, A.B., M.D., and
Smith Ely Jelliffe, M.D., Ph.D.

Several observations on conditions not typically Basedow's disease deserve mention. These conditions are of thyroid origin, but are not fully-developed classical thyreopathies. They have been designated as "goitre heart," or as "Basedowoid Conditions" (Stern[25]).

Since the symptoms of vagotonia (diarrhea, subjective palpitation, sweating, eye symptoms, tremor and general nervousness) are very similar to those of thyroid intoxication, the possibility must be advanced that certain questionable and atypical forms of thyroid disease may in reality be vagotonia. It is a frequent occurrence to diagnose Basedow's disease on the basis of one cardinal symptom,—as tachycardia—without determining the presence or absence of the main characteristic symptom,—increased metabolic exchange, with resultant loss of weight.

If this be made the crux of a diagnosis of Basedow's disease, it will be found that many cases of so-called incompletely developed Basedow's disease are in reality nothing but vagotonic neuroses. If these cases are operated upon it will be found that, as a rule, no good effect will be obtained, indeed there may be some aggravation of the disease. As to the symptomatic picture of cases of "goitre heart," we cannot fail to observe that the vagotonic picture is so conspicuous that there seems to be but a combination of vagotonia and goiter. The coëxistence of two

25 Stern, Differenzialdiagnose und Verlauf des Morbus Basedowii, Jahrbuch d. Psych. u. Neur., 1909, Vol. 29.

pathological, constitutional states, vagotonia and endemic goiter, must be thought of particularly in neighborhoods where goiter is endemic and where Basedow's and hyperthyroidism are known to be relatively infrequent (as in Styria and certain Alpine districts).

Some observations must be made upon the changes at the climacterium. This state gives rise to many nervous symptoms; some of cardiac or vasomotor origin, some of gastro-intestinal and metabolic origin. Analogous to these are the withdrawal symptoms after castration, when vasomotor disturbances are also to be found. Not infrequently one finds that there is an enlargement of the thyroid at the climacterium or during pregnancy. It is a simple deduction to suppose that when vasomotor or visceral symptoms coëxist with thyroid enlargement, a similar disturbance exists in the relations of the endocrinous glands, as undoubtedly occurs in Basedow's disease. If one analyzes the symptoms of the climacterium, one finds it easy to relate them to the symptoms produced by stimulation of the autonomic nervous system. The symptoms include unaccountable sweating. v. Gräfe's sign, marked dermatographismus, hyperacidity, and hypersecretion, colic-like pains about the pyloric or gall tract region, and high sugar tolerance. Other symptoms, most frequently observed in vagotonia, are respiratory disturbances and cardiac pains, associated with symptoms like those of angina pectoris vasomotoria.

The metabolic change, the post-climacterial obesity, may be contrasted with the emaciation resultant upon sympathetic stimulation (adrenalin poisoning). As a general rule vagotonic stimuli are most often observed in youth. It is therefore a matter of surprise to find disturbances as gastrosucchorea and pylorospasm in elderly men between forty-five and fifty-five. It would seem that men, like women, show symptoms of a climacterium, symptoms due to an absence of the sex-gland secretion, with consequent furtherance of autonomic stimulation.

Juvenile emphysema deserves a word of mention in connection with the relation of vagotonia to disease symptoms. Quite justly this disease is attributed to some disturbance of the respiratory mechanism. When the lung is distended for a considerable period by increase in the rate or the degree of inspiration, which almost exclusively serves the process of expiration, the passive contractil elastic apparatus is very materially overworked, and may eventually become insufficient. An increased tone of the

bronchial musculature will make the expulsion of air by expiration difficult and will cause a lasting distention of the lung.

Analogous to this is the diminished power of the elastic elements of the lung to expel the alveolar air by expiration, a condition which develops upon a chronic asthma, or a chronic bronchitis, and is due to relative narrowness of the bronchial tree.

Investigations carried out with the spirometer and described in a previous section have shown that in these cases we have to do with changes in the tone of the bronchial musculature. We maintain that increased tone in these muscles possibly aggravated by a coëxistent bronchitis, will, when combined with an insufficiency in the respiratory mechanism, pave the way for juvenile emphysema.

In confirmation of this theory, we would say that we have never failed to find signs of vagotonia in cases of juvenile emphysema. We have no clinical observations upon thymic asthma or laryngospasm of the newborn. It seems, however, that the mechanical element, compression by the thymus is not the only factor in their production, but that nervous disturbances, perhaps related to the thymus secretion, play a rôle in their etiology. We would suggest atropin for their relief.

It is no less interesting to give some attention to the nervous element of certain skin diseases, particularly those involving the blood-vessels. We, ourselves, have only studied urticaria, and as far as this group is concerned we can state that vagotonic manifestations are very conspicuous. We found high grades of hyperacidity, greatly increased gastric tone, almost a pathological state of peristalsis, and in most instances, eosinophilia.

Sweating is frequently complained of and hyperidrosis and troublesome salivation often result from the administration of pilocarpin. These individuals do not react well to adrenalin, and have a high sugar tolerance.[29]

Bronchial asthma and urticaria are not infrequently associated. The gastric changes did not give rise to symptoms in our case, and were in the background. When we consider that the vasodilators are controlled by the autonomic nervous system, and that the dermatographism seen in vagotonics may develop into an urticaria, the parallelism between vagotonia and urticaria becomes very striking.

[29] *Translator's Note.*—This statement has not been borne out in our experience, since 1 c.c. of adrenalin has been found to dispel some urticarial rashes in an hour or less.

A few observations upon anaphylaxis seem pertinent to our subject. If one inject a small amount of horse serum, and repeat the injection after three weeks have elapsed, severe anaphylactic phenomena result: a general eruption, collapse, dizziness and vomiting. The newer researches on the subject have shown that the symptomatic phenomena of anaphylaxis are due to autonomic irritation, and that these phenomena may, in some animals, at least, be relieved by atropin. These facts make it desirable, both for theoretical and practical reasons, to study the manifestations of anaphylaxis in vagotonic individuals particularly since we know that serum disease does not occur in all cases in which it might be expected. Isolated observations from various sources have been of great interest to us. For example, the injection of serum and particularly its re-injection in children who have been asthmatic or have had laryngeal spasm (spasmodic croup) has been found to be very dangerous. Since we feared acute anaphylaxis in our vagotonic patients, and wished to avoid the general symptoms, which it produces, we gave our second injections subcutaneously, and only observed the occurrence of local changes. Of thirty cases taken at random, only three showed any signs of a reaction. These three were vagotonics. Immediately after the injection, a large papular elevation formed about the puncture in the skin. This grew steadily larger. In the course of the next twenty-four hours, a general and very irritating urticaria developed.

In those who were not vagotonic the greatest reaction seen was the local one and this was absent in many of the cases. Further study of this question seems to us to be very desirable, not only on account of the dangers of serum disease, but also on account of its prevention by atropin. This study would seem to promise most if applied to children.

That the symptom, fever, lies in close relation to sympathetic stimuli is readily seen. Adrenalin will cause a rise in temperature, and cocain, which increases the action of adrenalin, may, according to the researches of A. Fröhlich, cause fever.

There is also much evidence to show that the various vagotropic substances have a temperature-reducing action. We also know that certain of the antipyretics cause some vagatonic symptoms as sweating and lowered blood pressure.[30]

[30] *Translator's Note.*—See editorial, Jour. Amer. Med. Assn., Vol. 62, p. 302.

It may be assumed that the relationship between vagotonia and fever is such that vagotonics will tend not to develop as high fever as those who are not vagotonics. It is well known that there are individual variations in the fever reaction in that some will develop a high fever after minor and insignificant infections. We may say that our study of vagotonics has not shown any parallelism between vagotonia and lessened tendency to develop fever. The only thing worth noting is a fact which has been mentioned before, *i. e.,* that those with sympathetic Basedow's have a greater tendency to rises in temperature than those of the vagotonic type. They are the group which react with high temperatures to mild infections. An attempt to prove a relationship between vagotonia and infection should certainly be made in the near future.

The clearest relations are those of tuberculosis. At the onset, many cases of tuberculosis show various signs of vagotonia, as a tendency to sweat, diarrhea, lowered blood pressure, stomach and intestinal disturbances. Furthermore the pharmacological tests with adrenalin and pilocarpin showed that scarcely any case of tuberculosis reacts to the former, while they always react with typical symptoms to the latter. A group of cases, which showed no signs of Addison's disease, did, however, show an increased sugar tolerance. This raises the question as to whether the toxin of tuberculosis does not have a specific predilection for the chromaffin system. Corresponding with this idea are certain findings in the adrenals in severe forms of tuberculosis. Though these glands show neither microscopical nor macroscopical changes, functional tests show that they contain very little or no adrenalin. There is also evidence to prove that scrofula, which is related both to tuberculosis and the lymphatic constitution, is associated with an over-irritable autonomic system.

Later we shall deal more in detail with Addison's disease and its relation to the lymphatic constitution, since in it the vagotonic signs and symptoms are most clear cut and are undoubtedly due to an absence of the adrenalin producing organs.

At all events, our few observations upon infectious diseases will make it easier to establish upon an experimental basis the etiological relationship between the vegetative nervous system and the disposition to infection.

(To be continued)

Periscope

American Journal of Insanity

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This number is devoted to addresses delivered at the opening of the Phipps Psychiatric Clinic, Johns Hopkins Hospital, Baltimore, Md. April 16-18, 1913.

2. *Address of the President of the Board of Trustees.*—Of general character.

3. *The Psychiatric Clinic and the Community.*—Review of the general aims of the clinic and its relation to the community.

4. *Specialism in the General Hospital.*—Historical and reminiscent, with suggestions as to the place of Psychiatry among the specialties in the medicine of the present and future.

5. *The Psychiatric Clinic.*—A sketch of what has been accomplished and what problems stand before the Psychiatric Clinic in the immediate future, especially emphasizing its function of investigating the beginnings of morbid mental habits and beginning psychic disturbances and of initiating methods of prophylaxis of mental disorders.

6. *Sources and Direction of Psycho-physical Energy.*—According to the purely physiological view the functions of the nervous system are made up of those of its individual neurones, each an irritable conductor which

reacts to any stimulation applied to it, and passes on a wave of excitement to all its parts. When it is in physiological connection with another cell or cells this wave of physico-chemical excitement acts upon these cells and provokes in them a similar reaction. These functional units are then regarded as " linked together on the plan of reflex arcs of various degrees of complexity through which physico-chemical change propagates itself according to the relative irritability or openness of the various paths thus constituted." According to this view the mental accompaniment of cerebral process, consists in the successive and simultaneous appearance in consciousness of sensory elements or sensations of many different qualities each being as it were attached to one of the higher or cerebral reflexes. Attempting to apply this conception to the cerebral processes involved in the higher modes of mental activity, the author soon found it inadequate and has found it necessary to supplement it with one which he calls the " principle of the vicarious usage of nervous energy." According to this conception, the energy converted from potential to active within each neurone upon its stimulation, must not be regarded as confined to this neurone, but capable of flowing on into and through other neurones from place to place in the central nervous system. This energy may well be denominated " neurokyme " (Forel) or psycho-physical energy. The whole afferent side of the nervous system especially the cerebellum and the basal ganglia of the cerebrum must be regarded as a great common reservoir of free nervous energy (neurokyme) from which all the various efferent channels can draw in turn. He says: " within the many parts of this common reservoir the quantity or potential of free energy must be conceived as varying from moment to moment according to the degree of stimulation to which it is exposed and according to the freedom of escape permitted to it, by the ever varying conditions of tension within the whole system." " But owing to the abundance of interconnection, the freed energy resident in each part can under favorable conditions be led in part at least to any of the many efferent channels, there to be vicariously used for the production of reinforcement of exec .tive activities. Such vicarious usage, it seemed to me, is involved in all processes of concentrated effort, whether of bodily movement or of attentive perception or thought." This notion of vicarious usage of freed nervous energy is also supplemented by the subsidiary hypothesis of the " common reservoir " of freed energy and that of " inhibition by drainage." The acceptation of this group of notions seems to go far towards explaining the fact that the nervous system works as an organic whole. This all however provides a mechanism only and for completion of the scheme it is necessary to recognize a peculiar function of organism " best expressed by the word conation " or will in the " broadest sense of the word, effort towards or striving after ends."

Observation of the behavior of animals shows that the activity of each species is directed mainly toward a small number of special ends—reproduction, securing food, escape from danger, protection of the young, with the violent destruction of whatever opposes these great tendencies. The concentration of an animal upon one of these ends does not depend upon acquired experience, but upon an innate tendency which we call an instinct. Consideration of human behavior shows also that man is endowed with similar tendencies by means of which the great ends of his activities are chiefly determined. " Whenever an organism, whether man or animal is placed in a situation which appeals to one or other of its instincts, which

excites or brings into activity one of these great conative tendencies common to the species, that organism acts with vigor and persistency; all its movements and attitudes imply a great liberation and expenditure of nervous energy, which energy is concentrated towards securing the instinctive end, and yet in its superabundance tends to overflow its prescribed channels and to suffuse the whole organism. And what we call emotion appears to be the bodily and mental expression of this great liberation of nervous energy, concentrated primarily in certain nerve channels specific to each instinct, but secondarily overflowing and diffusing itself through the whole or a large part of the system." Each instinct seems then to be in a sense a "spring of psycho-physical energy."

After considering the view that the neural nucleus of each instinct is made up of a group of neurones which are capable in a much higher degree than the others of storing up energy and discharging it, the author has found it unsatisfactory and has found the idea that "the great outburst of nervous energy which occurs upon the excitement of an instinct to activity, represents not so much the energy actually liberated by the katabolism of specialized neurones forming the kernel of the instinct, but rather energy liberated over a wider area and in some manner gathered together, concentrated, and directed to specific efferent channels, by the instinctive disposition." "May it not be then, that the essential kernel of each instinct seated in the basal ganglia is a wide channel (or one of high conductive capacity) upon which many channels converge both from below and from above (from the cortetx of the great brain)?"

Considering another feature of the subject, experimental researches, especially those of the Wurzburg schools have made clear the influence of the intention of the subject, that is the task to which is set the determining tendency, the attitude of consciousness that is the "conation." For instance, if a list of say twelve nonsense syllables is read in an attitutde of indifference, 150 repetitions may fail to form sufficiently strong associations to enable us to freely reproduce the series, while if the will is bent to the task it may be committed to memory in as few as 10 or 12 readings.

A mental process is effective in establishing associations in proportion to its involving strong desire or volition, which on the neural side means effective concentration of psycho-physical energy. The experiments mentioned not only justify the notion that conation involves special liberation of energy, but they also compel us to recognize that conscious conative effort once made, the conative process may continue to work subconsciously for an indefinite period of time. In this way laboratory researches tend to bridge over the gap between the older normal psychology and the newer psychopathology, the most important feature of which is the great influence attributed to subconscious processes. While the author is not prepared to subscribe to all the tenets of the Freudian school he holds with Bleuler, that its fundamentals are continuous with and are developments of psychological truths ascertained by other methods than psychoanalysis. The affectively toned "complex," whether repressed or not, has a functional reciprocity with one or more great conative dispositions. The Freudian notion of the transference of affect and that of the sublimation of a tendency he finds also abundantly demonstrated by the observation of normal mental processes, without resort to psychoanalysis, and fitting in with the scheme of neural functions which he has outlined. Freud's view of the development of the sexual instinct also harmonizes well with this scheme,

though the author cannot agree with the view that every other human in-
stinct is but an offshoot from it.

    7. *Autistic Thinking.*—Beginning with the story of a schizophrenic
who while he is ordinarily well behaved, works during the week and enjoys
himself on Sundays like the average quiet asylum patient, suddenly getting
the idea that he is to marry the Queen of Holland enters a country inn
where he is to meet his bride and can only be removed by force, the author
develops the fact that the thinking of this unfortunate, who has never
known aught but misery, is not different in its inception from the fairy
tales with which children and even adults have always indulged themselves,
only this man does not read a fairy tale or tell one but attempts to live one.
Each of us has his fairy tale and while under ordinary circumstances we
only indulge ourselves in secret and conceal our phantasies from the public
view, they nevertheless influence our actions far more than we are willing
to admit or even realize, so that the difference in manner of thinking
between the normal man and the lunatic is mainly a relative one, and with
us all, thought is often divorced both from logic and reality. This form
of thinking has been called by the author " autistic " " corresponding to the
idea of schizophrenic autism, which turning away from reality sees life
in fantastic pictures, and is founded precisely upon autistic thinking."

    Psychology has only recently turned from the study of logical thinking
to that of the autistic form, the knowledge of whose laws " alone throw
light upon the important but hitherto almost ignored inner life of the indi-
vidual, upon the influences which shape the creations of the poets, and upon
those which impel the peoples in their formation of their views of custom
and religion, and in their dealing with home and foreign politics." The child
ignores reality to a very high degree, he " plays " that so and so is the case
and for him person, animal or object assumes successively many rôles.
The true poet is in many ways like the child and upon his ability to develop
his own phantasy and to transfer his own feelings to the characters whom
he creates, rests his greatness and truth to nature. " Poetry is closely re-
lated to mythology and between the two stands legendary lore, the forma-
tion of which is naturally a very complicated one." We know that behind
many of the heroes there are no real persons for the German Siegfried
and the Jewish Samson are really sun gods. " The greater part of my-
thology is really symbolism." " The times of the year, the fructifying and
scorching power of the sun, the animal procreative power and similar
things are represented as human characters and actions." " The process
even more than in the poet is an unconscious one. The myths are under-
stood literally." All this is in direct contrast with the logical point of view
according to which all these notions though beautiful and poetic are non-
sense " Our human understanding can never compass everything; we can
therefore draw no hard and fast line between the two forms of thinking
but the more knowledge we possess the greater will be the possibility of
logical thinking." " As a rule the symbolism of the normal individual re-
places the conceptions which are difficult to represent and to conceive of,
or against which there is a resistance. Especially we like to replace ab-
stract by concrete ideas." For instance a whole railway system will be
represented by a wheel with wings, a serpent will represent sin." " In
dreams and morbid conditions symbols will not only be used more fre-
quently, but they will be extended to embrace even easily representable
things. A patient maintains that she is Switzerland and the Cranes of

Ibycus, which appears at first sight as nonsense. Upon more careful consideration however a certain sense is found in these assertions. The patient is confined against her will in an asylum, she desires to be free. Switzerland is a republic, a free country, she wants to be free, to be like Switzerland and finally she is Switzerland, Helvetia (the figure on the Swiss coins). She is moreover the cranes of Ibycus, that is, she has (in the lines of Schiller's poem)

> " Kept free from guilt and failings
> And pure her childlike soul."

" A particular form of autistic idea is the systematic shifting of sexual conceptions to other parts of the body, more especially upwards." " In the fairy tale as in the crazy ideas of the schizophrenic many a child is born from the mouth." Delusions of poisoning in women sometimes originate from their desire for offspring. " They believe, as in fairy tales, that they will become pregnant from the food they are given, and some supposed admixture with the food is symbolized as poison." " In autistic thinking the grossest contradictions may exist side by side " as well within the thought itself, as in its contradiction of the representations with the outside world. As the child may be at the same time " little Jack " and a great general so the insane man may be Brown and at the same time Emperor, Pope or God Almighty. As long as the insane are composed in their thinking they are partly conscious of the contradictions with what sound people call reality. So long as they are in need of causal connections they must seek an explanation for such contradictions. The man who has a delusion of great wealth may realize that he is not enjoying it, hence develops the idea of having enemies who are keeping him from his possessions, are persecuting him. " Autistic thinking has special connections with sexuality." And schizophrenic patients may enjoy the delights of love through hallucinations, though here the feeling of satisfaction is apt to be mixed with something unpleasant, the feeling of sinning against nature. Many desires are connected at the same time with agreeable and with disagreeable feelings, that is they are ambivalent. This ambivalency leads even in normal people to difficulties of decision and inner conflicts. Still more is this the case with schizophrenics in whom ambivalent tendencies seem frequently at the root of their delusions. A certain degree of ambivalency is always connected with sexuality and psychoanalysis shows that almost all men have at least in a rudimentary degree abnormal sexual tendencies, though the healthy person is scarcely conscious of them and overcomes them without effort.

This is noticed in the Oedipus-complex, and it was known even by the Greeks that this story was the expression of a universal tendency, as psychoanalysis shows to-day that there is a certain admixture of sexuality in the love of children for their parents of the opposite sex. " Autistic thinking is not bound by the laws of logic and reality. It is unlogical and permits the greatest contradictions with the outer world and in itself." From the examples given we can see how autistic thinking cut loose from logic will be directed; it has a tendency to represent desires as already fulfilled. " If we observe delusions in general we find that desires certainly play a great part in them, but that the delusion content is always dependent upon affectivity. The melancholic has depressive delusions and feels himself sinful, poor, incurably ill. The euphoric has grandiose ideas, he is a particularly clever man, and if his intelligence is somewhat disturbed, he may

possess the whole world and think himself equal with God." "The jolly do not think sad thoughts, the sad are even less inclined to let sad thoughts arise in them." "What keeps autistic thinking in the healthy person within certain limits is in fact logical thinking." "Where the balance between affectivity and logical thinking is upset, autistic thinking may get the upper hand." This occurs (1) in children, who lack sufficient experience " to discriminate logical possibilities." (2) " In subjects which are not sufficiently accessible to our knowledge and logic; in questions of the first principles, in the '*weltanschauung*' in religion, in love." (3) Where for any reason the emotions obtain too great a significance, as in strong affects, be they pathological or normal, whether they are caused by accidental circumstances or by the subject's own temperament. (4) "Where the connection of associations is loosened, as in dreams, in schizophrenia and so on." "While pleasant and unpleasant emotions have equal significance in the usual formation of delusions, in those emotions which are connected with particular ideas the effects of the two qualities are very different." There is a tendency to seize pleasure and repulse pain and ordinarily one will more easily call up pleasant than unpleasant ideas. Hence, "autistic thinking represents more fulfilled desires than realized fears." Suppression of unpleasant thoughts however does not always succeed and the repressed thoughts may "live on in the unconscious and from thence provoke abnormal symptoms which will be created in an autistic way," for instance someone wishes the death of a rival named Stout and goes in for a ridiculously exaggerated weight reduction cure to kill Mr. Stout in his own person.

Freud is inclined to identify what our author calls autistic thinking with the form of thinking of the unconscious. Autistic thinking may be just as conscious as logical thinking however, and every psychologist who does not deny the unconscious, knows that it also can think logically. Autistic thinking is peculiarly guided by such associations as correspond to the feeling-toned idea, that is to the desire or fear. Besides, secondary associations which in logical thinking are kept down as much as possible may become more prominent but only in so far as they can be used for the aims of autistic thinking. Thus objects spring from one object to a similar one and tend to generalize themselves. For example, a girl is frightened by a bull, the first impression being made by its genitals. She afterwards identifies these with the horns. Some years later she has forgotten the whole event, but becomes afraid of anything looking like horns so called by that name, for instance will not eat soup containing horn-shaped noodles. Symbolic images occur as well in the modern schizophrenic as in the makers of myths of old times and among savages. Hence some have spoken of an "archaistic form of thinking." The author cannot accept this opinion. Savages can think logically about things which they understand, but they understand fewer things, hence use more autistic thinking. Autistic thinking serves instincts especially in politics, particularly under the party system, which in many ways tends to lower public morality. How has autistic thinking served humanity? The boundary line between rational and autistic speculations cannot be laid down by human intellect. "What is inconceivable to-day may to-morrow become fact; what is firmly believed to-day may to-morrow become false." "Therefore, a humanity without autistic thinking could not have been developed." Nevertheless, both individual and national health need a balanced proportion between autistic and realistic, and the realistic must control the autistic.

8. *Personality and Psychosis.*—It is at times obvious that there is a relation between the mental characteristics of an individual and the type of the psychosis which he develops. Particularly is this noticeable in the manic-depressive psychosis, mild forms of which in particular sometimes appear to be but an exaggeration of the characteristics peculiar to the victim. The same thing is noticed to some extent for some paranoias, while in the more severe forms of manic-depressive the sequence is less clear. Coming to dementia præcox, the matter becomes more complicated.

Many authorities in fact regard this as distinctly a disease process of organic nature. Nevertheless there is a certain proportion of cases, though perhaps small, in which the patients have all their lives shown certain peculiar traits. In two series of studies the author found that in as high as from 50 to 60 per cent. of the cases the chief traits which had existed before the mental breakdown belonged to those which he at that time called " shut in tendencies." To these tendencies Bleuler has more recently given the name of "autism." He has also called attention to the possibility of a psychological interpretation of many of the symptoms and to many of the precipitating mental causes, for while physical causes play their part in precipitating attacks, mental causes are the more prevalent and important. These are not however always directly apparent, but often careful analysis is needed to elicit them. Comparing dementia præcox with the neuroses it is difficult to regard from the same aspect, the recoverable functional neuroses and dementia præcox, which leads to permanent mental deterioration. Nevertheless there is in both a defect in adaptation. There is no doubt that processes of an organic nature may, and do, accompany mental processes. Any defective endowment might hence be expected to have its organic basis.

Now the investigation of the brains of precocious dements sometimes reveals actual defects of development, such as atypical nerve cells, cells with two nuclei, indeed evidences of microgyria, etc. Again dementia præcox seems to be more often associated with congenital intellectual defects than manic depressive insanity or the neuroses.

Dementia præcox develops upon a more serious defect of constitution than, for instance, manic-depressive, though we cannot see any direct relation between intellectual and other constitutional defects. While dementia præcox is excluded from the so-called psychoses of the degenerate in the narrower sense, the author thinks that if we look without prejudice, transitions from dementia præcox to other constitutional disorders will be difficult to deny, although it cannot be proved clinically.

Considering manic-depressive insanity we find in a considerable proportion of the persons affected evidences of exaggerated emotions and a tendency of these emotions to be of the same nature as the psychosis and the parallelism between the personality and the psychosis is more evident than is generally believed. Manic-depressive insanity often represents an increase of a reaction type and its constitutional nature is generally admitted. The idea is frequently expressed that its attacks may represent an organic reaction and the fact that in general paresis and in Basedow's disease similar conditions exist, suggests this. On the other hand its symptomatology is essentially that of the normal emotional states and these latter are reactions to definite situations and determined by internal and external mental factors. Such a causal relation is often denied, however, in the case of pathological states. Interesting is the problem of anxiety. The anxiety found in neuroses has been looked upon as essentially an

organic reaction. The studies of Jones and Seif seem to the author to
show that the genesis of such attacks of anxiety are in many cases ex-
plained by external and internal situations so that in pathological states
also, anxiety preserves its essential character as mental reaction. It is often
impossible to find a precipitating mental cause in manic-depressive insanity.
Nevertheless such causes may be found upon careful search more fre-
quently than superficial investigation would lead one to think. It is to be
hoped and expected that further studies will bring us more and more data
showing the mental forces at work in this disease.

Both psychopathic personality and psychosis may be looked upon as
determined by constitutional factors in the sense that the individual is found
unfit to meet the demands made upon him either through inherent weak-
ness or at times also through false attitudes developed through lack of
training. In this last direction lies our hope of modifying these defects.

9. *The Personal Factor in Association Reactions.*—Purely psycholog-
ical and quite technical. The author shows in general however that the
reaction to the association experiment depends largely upon the personality
of the subject, though the emotional state is also important. A study of
the responses obtained shows that they may in general be divided into an
egocentric and concrete category. A careful analysis of these responses
with reaction times, etc., is capable of giving considerable information as
to the personality of the subject.

10. *Neuropathic Inheritance.*—The author four years before, initiated
a card system of the relatives who had been, or were in the London County
Asylums, and had collected records of nearly 3,500 cases. It turned out
that there were resident in these asylums 1,500 persons who were either
related to one another or had relatives previously in the asylums, and that
there were at the time 730 persons so closely related as parent and child or
brother and sister in the asylums. Analyzing this material the author ex-
poses his results in tables, by curves, etc. The following are some of the
chief points brought out. In 3,485 cases made up from 1,620 families in
which two or more members were insane, the statistics show (1) that
among the insane offspring of insane parents daughters are more numer-
ous than sons. (2) Among insane brothers and sisters, sisters predomi-
nate. With regard to " anticipation " or " antedating " he has found that
there is a distinct tendency in the offspring of insane parents for the
insanity to occur at an earlier age and in more intense form. In this con-
nection it appears also that in the offspring of insane parents if insanity
has not developed by the age of 25 years, the tendency for it to develop
progressively decreases from this on. The author's tables show this very
clearly.

Other facts also indicated are: (1) " The average age incidence of
male and female general admissions for each decade is almost identical."
The larger numbers of females in the asylums seems to be due to accumu-
lation, the females having mainly less fatal forms of insanity, particularly
less general paresis. (2) The female offspring of insane parents show a
slightly greater incidence early in life than the male, the most marked dif-
ference being in the early involutional period, 35-44 years." (3) Taking
the total offspring, there is far greater incidence in early life under 25
years. Of 663 offspring of insane parents examined, 95 or 1/7 were imbe-
ciles. At this point several geneological tables which illustrate very clearly
the points made, are introduced.

A comparison of single with dual inheritance gave the following: In
25 families with insanity on the side of both parents, there were 154 chil-

dren. Of these 20 died young, 46 were insane, had nervous disease or committed suicide, and 88 were apparently normal. 34.3 per cent. of those reaching adult age were affected. In 193 families with single inheritance only, there were 689 children. Of these 52 died young, 43 were insane, etc., 594 apparently normal. 6.7 per cent. of those reaching adult age were affected. In comparing direct with collateral neuropathic inheritance, there were examined 63 families with direct inheritance, having 304 children. Of these 27 died young, 61 were insane, etc., 216 apparently normal. Of families in which there were insane aunts or uncles, there were 91, with 354 children. Of these 28 died young, 12 were insane, etc., 314 apparently normal.

The author discusses at some length the hereditary transmission of temperament and tendencies. In collecting his pedigrees, he noted frequent association of insanity or suicide " in a stock preceded by or associated with the existence of individuals possessing the melancholia, suspicious, brooding, self-centered, hypochondriacal temperament." It is not uncommon to find suicide in successive generations of such families. Associated with such temperamental evidences of degeneracy, epilepsy, alcoholism and the neuroses are not infrequent. Most interesting are his pedigrees which show the creation of neuropathic inheritance in an originally healthy stock by the marriage of cousins each of whom has a latent neuropathic taint or by the introduction of a positive taint through marriage with an unrelated person.

The author thinks that his pedigrees show that the idea held by a majority of practicing physicians " that a chronic blood poison (especially when occurring in successive generations) produced by the racial poisons, alcohol, syphilis and tuberculosis, can per se cause degeneracy in a healthy stock by a pathological mutation of the germ plasma, which can be transmitted," has a basis of truth despite the objection of the biologists, that the poison may be acting upon the individual by reviving a latent neuropathic trait.

11. *On the Etiology of Pellagra and Its Relation to Psychiatry.*—The author analyzes the various theories as to the origin of pellagra which he divides into the corn theory and the infection theory under the latter head being included infection by schizomycetes, by hyphomycetes, and by protozoa. None of these does he find proved. Nevertheless a prophylaxis based upon the idea that the disease is due to the use as food of spoiled corn has in Italy by improving the nutrition and the hygienic condition of the poorer part of the population decreased the disease to one third its former proportions. In psychiatry the problem has been to decide whether pellagra produces a specific form of psychosis, or whether it acts only as a determining cause of one of the familiar forms, particularly of melancholia and amentia. According to the author's view, the depression of pellagra is not to be identified with melancholia, nor is the confusion to be considered as amentia. As diagnostic points of difference he mentions that melancholia as a rule comes on comparatively suddenly in a patient who has generally had a similar period of disturbance before, while pellagra comes on slowly after a long period of symptoms which are improperly considered as neurasthenic, without emotional excitement. The mood in pellagra is particularly sad, though there are occasional flashes of what may be considered as " gallows humor ('Galgenhumor')." The mixed conditions of manic-depressive have never come under his observation. There is considerable inhibition in the pellagra patient so that he is difficult of access and often gives the impression of being confused or demented.

Delusions may occur but they are not fixed and the pellagra patient has always a clear realization of physical illness, and does not trace his sad mood to external causes like the melancholic but rather to his disease. Insomnia is less frequent in pellagra, and diarrhea is as frequent as constipation is in melancholia. The depression of pellagra does not pass into a manic condition but rather into one of confusion. This confusion reaches its most complete form in what is known as "pellagra-typhoid" the difficulty of diagnosing which from true typhoid and from other chronic and often obscure infections is often very great. A careful examination with the aid of all the resources of the laboratory may be necessary to protect us from error here. In these patients there are sometimes neurological symptoms which are foreign to amentia but belong to pellagra, such as hypertonia, and exaggeration of reflexes. The patients are really not so confused as they appear and can often inform us as to their personality, etc., though they are to a greater or less extent disoriented especially as to place. Realization of illness is always present. Hallucinations are rather infrequent and not so manifold as in amentia. These cases may sometimes resemble delirium tremens and senile or presenile, anxious states. In these cases the confusion is more like that of amentia, the motor excitement is pronounced and hallucinations are abundant. The question as to whether or not pellagra may directly produce dementia the author considers as unsettled. He does not think it probable but cannot deny that arteriosclerotic dementia may occur, the arteriosclerosis being at least indirectly due to the pellagra. Pellagra is not a hereditary disease and produces no hereditary psychoses.

12. *Psychic Disturbances Associated with Disorders of the Ductless Glands.*—Starting out with a plea for the closer coöperation between the other branches of medicine and surgery and psychiatry as well as among themselves, the author proceeds to discuss the mental state of a number of patients with disorders of ductless glands, especially with those of the hypophysis cerebri and the pineal gland, who have come under his observation during the past few years. It has long been recognized that giants are as a rule dull, if not of pathologically low intelligence. In acromegalics, recurrent periods of "feeling acromegalic" in which there is an intensification of hopelessness, lethargy and depression is more or less characteristic and has been graphically portrayed, by Dr. Leonard Mark himself a sufferer. However in only three of Dr. Cushing's series of 30 or 40 acromegalics was this condition pronounced enough to suggest a real psychosis. One woman committed suicide. In hypopituitarism adiposis and infantile sexual development may be the rule but some of the victims have for a time at least been quite bright, even precocious and may have been able to occupy for a period quite important positions. As a rule they are mostly placid and euphoric though the author has found some who were irritable and restless. He tells of some cases in which the administration of hypophysis extract, the implantation in the brain of a pituitary gland from a stillborn child, or partial removal of a hypophyseal tumor effected some temporary improvement. As evidence that reduced function of the pituitary gland may play a part in the phenomenon of hibernation, the author states that in a number of woodchucks in this state, the pituitary glands examined in his laboratory, showed the cells of the anterior lobe to be "small, undifferentiated and uniformly free from the granules and varied staining reactions which indicate stages of secretory activity." As to the possible transmissibility of an internal secretory derangement he thinks that there is some evidence, Halstead having found histological changes in

the thyroid glands of the puppies of a partially thyroidectomized bitch, while clinical examples are given in the author's monograph on the pituitary gland.

That precocious adolescence may occur in conjunction with lesions of the pineal gland is well known. The cases of two boys, in one of whom the secondary sexual characters had appeared at three and in the other at six years, are mentioned. Both of these showed mental deviation with lack of inhibition. In casting around for a pathological basis for the sexual deviations which play so large a part in the conceptions with regard to the psychoneuroses of the Freudian school, our author thinks that the internal secretions which seem to have so direct an effect upon the sexual activities may well be considered. This article contains much more that is of interest, but more especially from the standpoint of internal medicine.

13. *Primitive Mechanisms.*—A plea for the careful reconsideration and possible revision of our psychological conceptions and terms. The author is convinced of the necessity for studying all reactions as biological units, beginning with those which are most early manifested in the embryo and passing from the more primitive to the more complicated adjustments. "Adjustments taking place in isolated planes may be described in books but never occur in living things." "Since the synthesis of complex mental states brings us face to face with formidable theoretical difficulties, may we not avoid a dilemma by a more direct method of investigation of individual reactions?"

14. *Problems of Dementia (Demenzprobleme).*—(In German, though a résumé in English is added.) The author as a former pupil of Wernicke was asked to choose some subject which should give an insight into the development of the school of thought which has borne the name of Wernicke, since his untimely death. Since Wernicke's work as a neurologist and especially his views upon aphasia have received such general recognition it is to-day considered so much a part of medicine that it cannot be claimed as a possession by any particular school. It is different with regard to his psychiatric views since no one, among his most devoted pupils even, has accepted them in toto. The genius of Wernicke and the influence of his ideas is however shown by the fact that while to practical psychiatry they do not appear at present to have contributed much, they have nevertheless considerably influenced psychiatric thought, while none of his pupils can be said to have added to them. As a personal scholar of Wernicke during the time he was preparing his "Grundriss der Psychiatrie," and on the ground of his own personal interest the author has chosen as the subject of his address the problem of dementia, since in no direction was Wernicke's interest so stimulating as in the study of defective conditions in the broad sense. It is generally conceded that the term dementia implies psychical inferiority though the question whether it must be permanent and irreparable or not, is still under discussion. For clinical purposes it is certainly desirable to distinguish between curable and incurable conditions, but how difficult this is, is shown by the fact that climacteric and some other depressive conditions in which a permanent defect has been assumed to be present, sometimes clear up. Such experiences however do not permit the assumption of a basic difference between temporary and permanent defective conditions in every case, and that the same cause may upon one occasion produce a temporary defect, but on acting further a permanent one is not excluded. This is particularly evident when we consider general paresis in its remissions and it is important to distinguish here between psychotic symptoms which in the narrower sense are capable of improvement, and

the loss of mental capacities which persist uninfluenced during the remissions. This brings up the question as to whether symptoms which are usually considered as part of a definite defective condition may not also occur, as transitory defects capable of repair. That this is possible the author thinks is proved by certain symptoms observed in presbyophrenia and in Korsakow's disease and more particularly by what is often observed in epilepsy. The same thing is illustrated in the somatic sphere by the occurrence after paretic seizures of paralytic phenomena which later clear up to a greater or less extent, but are rendered more and more permanent by successive attacks. The analogy between such purely somatic defects and the development of dementia, must ever awaken in us the hope of reaching a pathologico-anatomical conception of the psychoses, though so far we have made little progress in this direction. Still more difficult is the answer to the question what constitutes dementia, or can we consider dementia as identical in every case differing only quantitatively from case to case or from time to time in the same case. This last would seem to be denied in nearly all text books, since there are described for instance, paralytic, senile, epileptic, hebephrenic dementias, etc. We are however here describing the cause not the character of the dementias.

The problem of dementia is closely bound up with that of intelligence. Is this a unique phenomenon upon which a number of more special manifestations are dependent, or the sum of a number of components combined in varying manner? From experimental results the former view would seem the more probable. The high degree of correlation which they found between a number of relatively simple capabilities (among which learning by heart was not included), led Krueger and Spearman to conclude that they were influenced by some central factor. The capabilities tested by them, however, are far from constituting actual intelligence in the higher sense. In such experiments the psychological methods of testing intelligence have generally been used, and it seems that these do not necessarily carry out the end of the psychiatrist who desires to learn whether or not dementia is present. These two problems are by no means identical, since for instance there are certain capabilities whose presence by no means implies intelligence but which cannot be absent without there being mental defect. For instance, idiots often are observant though not intelligent, while compete absence of ability to notice (" Merkfähigkeit ") what is going on necessarily implies decided mental defect. It seems on the whole that we are even less likely to arrive at a unique conception for dementia than for intelligence. Foerster and Gregor who have carried out upon paretics similar investigations to those of Krueger and Spearman in normal individuals, have been able to show—in so far as testing such things is possible in paretics—that between the processes which in normal persons are in correlation, there is similar connection, and that the functions so correlated are injured to an approximately equal degree by the process underlying the disease, and have come to the even more important result that a process outside this correlation, ability to learn, is not only affected in varying degree but also that the difference in individual paretics is very great, this sometimes suffering more, sometimes less than the above mentioned functions. If such great differences are found from person to person in a disease anatomically established, how much the more are they to be expected in conditions in which no such relation can be determined! At the start it was postulated that dementia was to be considered as constituted by symptoms of loss or defect, but how separate these from the psychotic symptoms proper or those characterizing the disease? Indeed

many of these psychotic symptoms (in the narrow sense) as affects, delusional interpretation of the examination, may make any proper testing for defects impossible.

Of much greater difficulty is the separation, theoretically so easy, of defect symptoms from psychotic symptoms in the restricted sense. The most typical example of this is the long-disputed point as to whether in the paranoiac, inability to correct delusional ideas, which to us seem entirely absurd, is due to the nature of the delusions themselves or is to be considered evidence of dementia. It appears to the author that such questions can never be solved as long as one clings to the conception of dementia as a unique process, since in spite of the examination of new material they are bound to be answered in the sense of one's individual ideas upon the subject. Similarly the question may be put, whether in the terminal stage of dementia præcox there is really a dementia in the restricted sense, or simply reduced ability. It has always been known that such patients know more than they appear to, and Penon has shown by his investigations upon old asylum inmates how moderate the actual defect is, since they not only know a great deal but can under the tests accomplish a great deal, when conditions are favorable, that is when those factors which disturb carrying out the tests or make them impossible and so give the impression of severe defect, can be eliminated. These influences are known to vary from minute to minute and to depend largely upon external influences, the personality of the observer, etc. All this shows that the appearance of dementia may be produced not only by actual loss of capacities, but also by other factors, as tension, negativism, etc., which are more nearly related to psychotic than to defect symptoms, and which show their irritative character by their sudden variations, etc. The idea of a unique dementia is further shattered by the difference of the defects found in paresis, in epilepsy, in presbyophrenia and in juvenile defective conditions, while there is always the question whether the defects demonstrated by our methods of testing really constitute the " essence " of dementia. Penon in his experiments above mentioned, found in an old " circular " much poorer response to his tests than in many precocious dements though this individual did not produce the impression of being anything near so demented as these. When it comes to be considered not only whether there is an actual central disturbance, but also not what dementia actually is, but what is to be understood by the term, we bid fair to lose ourselves in boundless discussion. Even defects in knowledge must be interpreted with much caution since the testing of recruits by Rodenwald, etc., has shown that the line between actual defect and mere ignorance is not a hard and fast one. Whether the Binet method which has proved so useful for testing school children is equally applicable for adults or suitable for testing for dementia is a question.

A question analogous to that of dementia is, what is disturbance of consciousness and what constitutes it? Considering loss of memory for a given period as proof that consciousness has been lost has, in the author's opinion led to unwarranted extension of the conception of epilepsy. Studies on epileptics, typhoid patients and cases of concussion of the brain show that loss of consciousness is made up of a number of components and that the study of these elementary symptoms does not yet make this phenomenon clear to us, as it leaves the feeling that we have still missed something, perhaps the most important thing. In so far as dementia presents itself to us as a unique whole, the idea that this impression is made up from the cumulative action of different components appears more satisfactory than that the individual symptoms are different results of a common basic disturb-

ance. As to the anatomical basis of dementia, the idea has obtained that forms of insanity leading to dementia must have an anatomical basis, and here it seemed that the bridge should come, over which we might hope to pass from organic brain disease to mental disease. These hopes seem at the present time little likely to be realized, though of late it has been asserted, perhaps with too great emphasis, that all psychoses with anatomical basis must lead to dementia while in all the others it is futile to search for pathologico-anatomical changes.

In the last decade, Nissl, Alzheimer and others, following in their steps, have furnished us with valuable data for the control on autopsy of our clinical diagnoses, especially by their contributions to the pathological anatomy of paresis, senile and arteriosclerotic alterations, Alzheimer's disease and idiocy, but these are important more from the neurological side, than as giving anatomical bases for sharply defined and readily diagnosable psychic disease pictures. We can hardly speak of any correspondence between anatomical findings and forms of dementia either quantitatively or qualitatively. It does not however seem preposterous to hope that with gradual improvement of technique we may enlarge our knowledge of the grosser changes in the brain and may bring them more and more into connection with disturbances of function which experience has taught us are connected with certain regions. We cannot, however, at present connect " psychological " defects with lesions of definite cortical cell layers.

On the whole it takes more optimism to speak of the possibility of an anatomical localization of mental diseases as brain diseases to-day than it did when Wernicke wrote 20 years ago, and the increased skepticism in this regard is to be referred, on the one hand, to the lack of fulfillment of former hopes, and, on the other, to the altered views as to the nature of the mental processes which have become more and more apparent of late in the last years.

15. *The Inter-relation of the Biogenetic Psychoses.*—The greatest amount of work in psychoanalysis has been done in the neuroses and important information as to their mechanism has been obtained. In the psychoses proper less has been accomplished, but still something has been done. For instance, it has been shown that in dementia præcox there are unconscious psychogenetic mechanisms akin to those found in the neuroses, and that there is a regression of mental processes toward a more infantile type, Bleuler's autistic thinking. Freud's studies in paranoia are also of interest as showing by comparison that paranoia, dementia paranoides and paraphrenia, represent stages in the regression of the mental processes toward a more primitive ontogenetic state. In studying a psychosis we have to consider not only the disease but also the patient's reaction to it and the conclusion is now justified that many of the symptoms are really defense mechanisms as in hysteria, for it is well known that symptoms usually considered as hysterical are found from time to time in the psychoses. The status of manic depressive insanity has been changing of late years, mainly growing at the expense of the dementia præcox group, the hard and fast boundaries which were formerly thought to exist between the two groups having been found to be non-demonstrable often. The author and Brill have found that there are cases clinically appearing as manic depressive insanity which are shown on psychoanalysis to be of the nature of anxiety hysteria. Though these cases should really be separated from the manic-depressive group, the author thinks that closer investigation will show as close relations between manic depressive and hysteria as between dementia præcox and hysteria. On the whole, he is coming around to the view that in

psychoses proper (insanities with organic basis being excluded from consideration), the symptoms observed depend not so much upon essential differences in nature, as upon different types of reaction to a fundamentally allied group of difficulties, namely "intrapsychic conflicts of a biological nature."

16. *Prognostic Principles in the Biogenetic Psychoses.*—On the basis of what he had observed in the clinic, Kraepelin taught that a sufficiently keen analysis of clinical pictures would permit the differentiation in the early stages of cases of good and of bad prognosis through the predominance of certain symptoms or their groups. That this is however not entirely safe or satisfactory is shown not only by the statistics of Kraepelin's own clinic, in which the diagnoses of dementia præcox have fallen from at one time as high as 52 per cent. of admissions to 7 per cent. in 1909, while they vary at other clinics from 30 per cent. at Zurich to 12 per cent. at Ward's Island. In opposition to Kraepelin's idea that a correct diagnosis settles the prognosis, the author has formulated a psychobiological interpretation of these psychoses, according to which the symptoms represent biological reactions of the mental type, the psychosis expressing a defective biological adaptation of the individual. This conception does away with the necessity for assuming that the outcome is determined by the kind or severity of a disease process itself unknown, but accounts for the course and termination by the action of the forces at work in the individual and the type of reaction itself, some reaction types being unfavorable for return to normal, others less so. The pure forms of manic-depressive reaction type represent chiefly an emotional deviation and the symptomatology is remarkably free from elements opposed to correction later, so that the prognosis is good.

In dementia præcox however, the psychosis appears to be the "outgrowth of a long-continued period of unhealthy biological adjustment on the part of the individual." Meyer showed clearly how indications pointing toward defective adaptation could often be recognized long before obvious breakdown, in many cases even in early life. It seems improbable that general prognostic principles such as brought forward by Kraepelin can ever be successfully applied to large groups of biogenetic psychoses. As a contribution to the prognostic value of a symptom group the author reports the result of his observations on the so-called catatonic syndrome. While originally considered as of very unfavorable significance, its importance has greatly diminished in this respect, since even Kraepelin admits that 15 per cent. of his catatonics recover and it is well recognized now that the syndrome may occur in a number of psychotic conditions both of organic and of functional origin. We have no satisfactory explanation of it, even psychoanalysis having failed to throw much light upon the subject. Negativistic stupor has however the general characteristics of a defense reaction or protective mechanism, whereby the individual shuts out the external world. Obstinacy and irritability may simulate negativism and where there is much perplexity or retardation the patient may appear negativistic.

The author has analyzed 80 cases from Ward's Island in which this syndrome was present and has divided them into three groups. (1) Catatonic Psychoses Associated with Deterioration. A study of these seems to show that the catatonic reaction was always preceded by a period of ominous prodromes which should give some hint as to the probable termination. (2) Psychoses Essentially Catatonic Throughout, but Ending in Recovery. Most of these were instances of catatonic stupor or depression with catatonic behavior. Many lasted over two years, and recovery was a

surprise. One of these was in a catatonic condition for over 5 years but ultimately recovered. There was nothing in her mental make-up or the development of the psychosis to suggest deterioration, but the symptom-picture and the long duration led to an erroneous prognosis. The author thinks that when the reaction is exclusively or chiefly stuporous the prognosis is good. Unfavorable signs are odd behavior, grimacing, stereotypy with gradual establishment of stupor, negativism and fixed postures. (3) Psychoses presenting Besides Catatonic Symptoms Manic Depressive Features. Many of these were wrongly judged to be deteriorating types because of overvaluation of the catatonic manifestations. There were instances where in the same individual there was at times a manic-depressive and again a catatonic syndrome, and it appeared that a catatonic phase might replace the depressive one in a circular case. There was sometimes a peculiar intermingling of the symptoms. In summing up the author concludes that from the catatonic syndrome alone, a correct forecast cannot be made. More reliable prognostic data are gained by a study of the constitutional tendencies and the mode of development of the psychosis. When the anamnesia reveals a gradual change in the personality with indications of that type of defective biological adaptation which we are coming to look upon as a foundation for dementia præcox, the prognosis is bad.

17. *Anatomical Borderline Between the So-called Syphilitic and Meta-*syphilitic being more especially in the meninges, the metasyphilitic in the author's findings in six cases—illustrated by some excellent plates—which show how difficult it is to separate the changes of cerebral syphilis from those of general paresis. He thinks that the most helpful viewpoint is to regard syphilitic and metasyphilitic disorders as usually distinct varieties of the same general process. This viewpoint is based upon the following facts: In the brain stem and spinal cord of both groups, the character of the exudate and its distribution are much the same. In the cerebral hemispheres while the exudate is the same in kind, it differs in distribution, the syphilitic being more especially in the meninges, the metasyphilitic in the cortex as well, though there are borderline cases which may be interpreted either way. Further, gummata and syphilitic endarteritis sometimes coexist with general paresis. In tabes with mental symptoms the brain may show changes either of syphilis or of general paresis. The serum reactions coincide. The discovery of the Treponema pallidum in all of these disorders points to a common origin. Nevertheless, it is desirable to keep them separate for study in what seems to be their natural relationships.

18. *Pernicious Anemia.*—A report of six cases of pernicious anemia associated with mental symptoms, with clinical histories and anatomical examination (with plates). Two cases were of depression, four of a paranoid condition in which the delusions developed upon a basis of irritability and suspicion. The author concludes that mental diseases of more than incidental importance may be associated with pernicious anemia, and that these are not always of the amentia type usually described, but are more chronic, showing resemblance to mental disorders symptomatic of toxic conditions. There may be pathological changes in the cortex of the brain, in their finer aspects like those observed in mental disorders associated with toxic influences and also specific lesions, which resemble those occurring in the spinal cord in pernicious anemia.

19. *Closing Remarks.*—A look over the field covered by the numerous excellent addresses with a retrospective glance at what has been accomplished by American psychiatry in the past twenty years and suggestions as to its tasks for the future.   C. L. ALLEN (Los Angeles).

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Original Articles

REPORT OF SEVEN CASES OF BRAIN TUMOR

(WITH AUTOPSIES)

WITH ESPECIAL REFERENCE TO DIFFERENTIAL DIAGNOSIS*

By S. P. Goodhart, M.D.

NEUROLOGIST OF THE MONTEFIORE HOME AND HOSPITAL; ASSISTANT PROFESSOR
OF CLINICAL NEUROLOGY, COLUMBIA UNIVERSITY, NEW YORK

AND

H. Climenko, M.D.

CHIEF OF CLINIC, DEPARTMENT OF NERVOUS DISEASES, O. P. D. MT. SINAI
HOSPITAL, NEW YORK; ADJUNCT NEUROLOGIST OF MONTEFIORE
HOME AND HOSPITAL

FROM THE NEUROLOGICAL DEPARTMENT MONTEFIORE HOME AND HOSPITAL,
NEW YORK

The conception of neoplasms of the brain dates back to early medical annals, even to the time of Hippocrates; but in spite of decided progress, especially in recent years, in our knowledge of the physiology and anatomy of the nervous system, the recognition and localization of brain tumors too often to-day confront us as a perplexing problem.

* Pathological notes were made by Dr. David Felberbaum.

While there are really only two areas wherein pathological changes apparently fail to give us symptoms, namely the right frontal and right temporal regions, yet even lesions in areas of recognized functions are often overlooked or misinterpreted not infrequently by competent observers. Wherein lie the causes? Let us consider a few of these.

A commonly misleading factor is the distortion given by the functional element as in our cases S. L. and S. S. Both of these patients were unquestionably of an emotional type, inclined to hysterical symptoms. and on account of this a true organic lesion was long overlooked. Since we are by no means certain as to how long the tumor in this case may have been in process of development, with the possibility of remissions, it is not unlikely that the apparently purely functional symptoms were really due to the presence of the growth, especially because of its location in the frontal lobe.

Another common source of error in localization diagnosis is the overlooking or disregard of very early manifestations. The neurologist makes light, perhaps, of the first symptoms, or even fails to obtain an accurate account of the initial, often purely subjective manifestations; well versed, doubtless in brain anatomy, his deductions are sometimes made entirely upon objective and subjective findings at the time of the examination; there is overlooked the possibility, at least, of already dealing with indirect or distal symptoms. These may be evoked by secondary changes within the cranium, such as edema, dilatation of the ventricles, interference with vascular supply. forcing of contents of the posterior fossa in part into the foramen magnum, etc.

Two of our cases furnish excellent examples. In one (S. L.) an easily operable growth was overlooked in its location by reason of predominance of thalamic symptoms at the time the operation was determined upon. The then existing symptoms were really secondary, remote from the growth and due to indirect pressure. These thalamic symptoms developed late in the course of the disease. A careful analysis of the history shows that the initial symptoms pointed to the exact location of the growth.

In the case of A. S., in which the tumor was far anterior, affecting the frontal convolutions, the right cerebellum was found jammed into the foramen magnum which explained the presence of symptoms directly pointing to a lesion in the posterior fossa.

Further: strictly motor symptoms may be misleading. For example: localized true motor spasm, regarded as a result of cortical irritation—really cortical epilepsy—is doubtless often due to a stimulus from some remote part of the brain. Our case of S. S. illustrates this. The case was long regarded as one of epilepsy. The cortical motor area was not directly involved and the provocative element must be sought elsewhere. Thus while we know that increased cranial pressure may give rise to general convulsions, we are accustomed to look for the Jacksonian type—localized seizures—as starting from direct irritation in the motor cortical area. However, personal observation in our case cited, and others of a similar nature, lend strong evidence to our belief that irritation, especially by neoplasm of the subcortical motor fibers anywhere in the motor radiation, may cause localized seizures. As pointed out in one other of our cases (S. L.) and in accord with not infrequent observation, instead of the usual subtemporal or occipital decompression for the relief of intracranial tension and pressure, it would seem more advisable if the skull were opened at the probable, or at least at the possible site of the lesion.

Observation of the features in the various cases here reported are made under their respective histories. The usual symptoms met with in brain growths are fully dealt with in the special text books.

CASE 1.—Miss S. L., aged 37 at the onset of her illness in June, 1912, family and early personal history essentially negative, died March 31, 1914.

The earliest history bearing upon the illness which caused her death dates back to June, 1912. There was first noticed by the patient sensations in the fingers of the left hand which were doubtless paresthesia; there followed successively weakness of the left hand, fingers and arm, though the patient continued her work; soon, however, the finer movements, such as required in piano playing, sewing, etc., became impossible. At this time the diagnosis of neuritis was made by her attending physician.

In November, 1912, there was beginning weakness of the left lower extremity and also excessive emotional effects, variability of moods and uncontrollable laughing and crying. She then had no headaches, no nausea or vomiting, no vertigo, no eye symptoms; nothing to suggest general symptoms of neoplasm. During this month the patient suddenly lost all power of the left lower extremity and fell to the floor; this weakness disappeared within twenty-four hours. Doubtless because of the general nervous manifestations and what was then regarded as a purely functional

paralysis, the diagnosis of hysteria was made. The weakness of the left arm and leg advanced so that the patient dragged the left foot and the left arm was held in a position of semi-flexion due to contracture. At this time also the patient felt pain in the arm, but it was indefinite in character and not constant. Somewhat later an asymmetry in facial innervation was observed affecting especially the lower branches.

Dr. Abrahamson and Dr. Strauss saw the case at this time and after a thorough examination suggested the probability of a thalamic tumor. This diagnosis was certainly warranted by the thalamic symptoms. Status of the case by these gentlemen has been incorporated in our paper.

In March, 1913, at which time the patient's condition was as last described, a diagnosis of thalamic thrombosis was made. A blood Wassermann was negative.

In April, 1913, the patient began to complain of frontal headache, continuous in character and unrelieved by drugs. For some time previous to this there were convulsive attacks confined to the left arm, coming on about six times daily and characterized by a violent tremor of the left hand and forearm, which lasted several minutes and was followed by a spasm in which the hand was tightly clenched so the patient was unable to open it; this spasm lasted about a minute. Upon admission to Mt. Sinai Hospital during this month, physical examination showed left facial palsy, abdominal reflexes diminished, and the left arm held approximated to the side, there being only slight contractures. The left lower extremity motor power was only slightly diminished but the knee jerk was diminished. At this time an eye examination was made; both fundi showed evidence of beginning choked discs; the remains of a former choreo-retinitis were emphasized by the examiner as in character and position suggesting a syphilitic lesion. (See A. S.) Lumbar puncture and blood Wassermann gave negative results. There was also noticed at this time hyperesthesia over the left half of the body. A series of salvarsan injections was given and a gradual but progressive improvement of the power of the left arm and leg was noted.

Early in May, however, the involvement of the discs progressed to manifest optic neuritis of both eyes. There likewise developed a tremor of the *right hand, fingers and forearm* strongly suggesting the tremor of paralysis agitans; it could be influenced by the will though intensified on attempts at voluntary movement. In the latter part of May, following a number of salvarsan injections and large doses of iodides, the fundus examination showed marked improvement and the optic neuritis was reported in the regressive stage.

In June lumbar puncture and Wassermann again gave negative results; neosalvarsan was given again, however, and marked improvement in all symptoms was noticed. Deep injections of salicylate of mercury were also given.

In December, 1913, the right pupil was found larger than the left; corneal reflex absent on the right side. It was also found at this time that the paresis of the left facial was both for voluntary and involuntary innervation.

The history of the case for several months was not accessible and therefore cannot be included here. We know, however, that during this time there were attacks of projectile vomiting with frontal headaches.

In January, 1914, the following bedside notes were made: Left hemiplegia involving lower and middle facial; a fine, rapid tremor of the right hand; stereognostic, deep tactile and postural senses absent in left upper extremity; pain sense intact; left homonymous hemianopsia; upon smiling, left facial paresis disappears, but the left facial muscles move after the right innervation has begun.

At this time a diagnosis was made of deep-seated neoplasm involving the thalamus and tracts between the thalamus and the cortex. A decompression, or callosal puncture was advised. It is of importance to mention that in the latter part of January, 1914, some indefinite psychic symptoms were observed; whether based upon hallucinations or illusions the observations of that time fail to make clear. Contrary to the fact and without material basis for such belief, the patient claimed persons were coming in and leaving the room during the night and that she was being constantly removed from one place to another.

On January 2, 1914, a right subtemporal decompression was done; only slight pressure and normal pulsation were found. An exposure was also made for puncture of the corpus callosum. It was then supposed that only the outer table of the skull was penetrated; the hemorrhage immediately became so excessive that it was not deemed advisable to further expose the patient since the measure in this case seemed not so strongly indicated. This tumor might easily have been removed en masse.

On January 12, the patient's mental state was found to be so clouded that a careful psychological examination was impossible, though attempted, as the patient was not in condition to lend herself to analysis. The abdominals were still absent; the left hemiplegia with the usual contractures had advanced and become almost complete. The left knee jerk was still absent, with decided Babinski on the same side. The facial paresis was present both in voluntary effort at control and expressing emotion. The hemianopsia had disappeared. The pupils reacted fairly promptly, the left somewhat slower than the right. Tremor of the right hand was still present. The left corneal reflex diminished. This continued until death supervened on March 31, 1914.

The pathological findings as observed in the gross specimen are as follows: Viewed en masse from the right lateral aspect a large endothelioma is seen occupying a deeply excavated portion of the

right hemisphere at about the middle. The growth replaces fully
a third of the external surface. Posterior to the growth the con-
volutions are found compressed so that actual loss of brain sub-
stance is only apparent and not real. The several convolutions
can be easily identified though forced together by the compressing
action of the growth. The tumor extends from just anterior to
the ascending frontal convolution, exercising its greatest and direct
pressure, therefore, at this part, cleaving the frontal convolution
as the growth extends into the depths; below it just touches the
first temporal convolution. The depression, or crater-like appear-
ance of the center of the growth with its adherent dura and pig-
ment is due to the trephining begun for the callosal puncture. The
mesial aspect of the right hemisphere shows the tumor reaching to
the corpus callosum. The tumor measures in its horizontal diam-
eter 3 inches; antero-posteriorly, $2\frac{3}{4}$ inches and $2\frac{1}{8}$ inches in
depth. These measurements were taken after hardening. The

Fig. 1. Miss S. L. Showing cavity in hemisphere left after growth was
removed en masse.

tumor is easily separated from its bed, leaving the latter as a glazed
surface showing numerous depressions corresponding to the cauli-
flower-like excrescences of the growth. A sagittal section through
the center of the tumor shows the compressing effect on the deep
structures especially the central ganglia, more particularly the optic
thalamus of the same side. The internal capsule is entirely dis-

torted and displaced. The thalamus is flattened. The radiate fibers from the cortex, especially anteriorly, are greatly compressed.

Upon removal of the tumor from its bed and then looking upon the surface of the brain from above, one sees a decided enlargement in the lateral diameter of the right hemisphere, especially the anterior portion. Whether this is due, as claimed by Spiller and others, to a real hypertrophy of the brain, or rather to displacement, cannot be positively decided by macroscopic inspection. We are inclined to think that in this case the appearance of enlargement is really illusory.
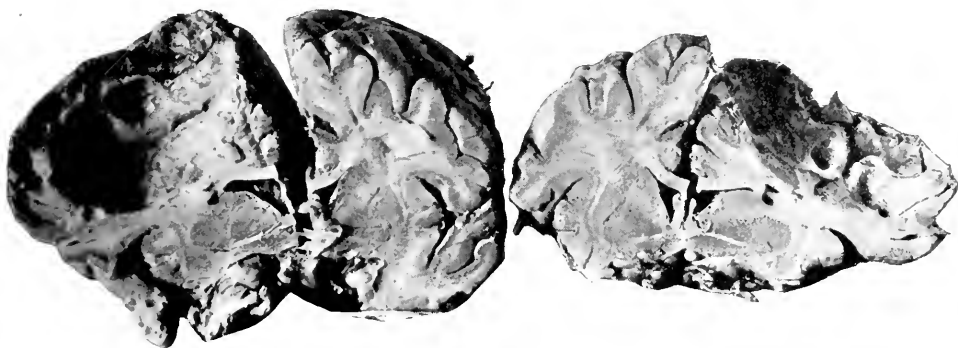
FIG. 2. Miss S. L. Section of hemispheres (tumor removed) showing depth into which tumor descended into the brain.

[Path. Note. This growth shows the minute structure of a typical endothelioma. One sees spindle cells arranged in densely packed layers. (Same as Mrs. H. G.) The nuclei take on a deep stain while the protoplasm is not faintly stained. Few vessels are seen. No psammomatous material is found in the specimen.]

There are some interesting features in the analysis of this case. Firstly, it is indeed remarkable that a tumor of this size should give symptoms covering a period of 21 months only. It will be noted that the first symptoms were paresthesia of the fingers of the left hand. This symptom was a clue to the site of the growth and was due either to pressure on the cortex, or more probably on cortical thalamic fibers.

A rather unusual symptom suggesting the involvement of the frontal lobe and anterior thalamic region was the early dyspraxia noticed in lack of proper use of the fingers and hand, especially in the finer movements; the early diagnosis of neuritis from these symptoms shows the need of a more careful discrimination.

The course of the anatomical involvement of the extremities with the psychic symptoms, especially of an emotional character, likewise suggested the position of the tumor in the motor area extending into the frontal lobe. Though the tumor must have been of rapid growth, there was during the first year conspicuous absence of important general symptoms such as headache, vomiting, vertigo, or ocular symptoms.

The sudden loss of power in the left lower extremity, disappearing within 24 hours, was doubtless due to temporary edema or transitory circulatory disturbance. The diagnosis of an hysterical paralysis at this time before patient was admitted to hospital was doubtless based on the absence of all general organic symptoms of tumor, the undue emotion of the patient and transitory paralysis. These symptoms are readily explained by the anatomical position of the growth and we have here another example of the need of care in not mistaking organic for functional symptoms. The slowness of the onset with subjective sensory symptoms was due either to interference with the coronal radiation, as is evident from a glance at the specimen or, less likely but entirely possible, indirect pressure upon the internal capsule. Also, because of the spontaneous pain in the arm, pressure on the thalamus, or even a thalamic lesion was to be thought of; and this diagnosis was made somewhat later.

It is remarkable that only in April, 1913, late in the disease, there appeared frontal headache, continuous and unrelieved by drugs. The frontal headache as a late symptom could be accounted for on the ground that much pressure on the frontal lobe was not exerted and the meninges not extensively involved; in other words, the tumor probably grew out of the depths, beginning in one of the deep sulci, early exerting some pressure immediately in the region of the thalamus; the gross surface appearance justifies this conclusion.

The convulsive attacks confined to the left arm, followed by spasm but with no interference in consciousness, was strictly a focal symptom and again pointed to the localization of the growth. It is to be noted that the hemiplegia observed in April, 1913, was characterized by only slight contractures; this is explained by reference to the specimen which shows no real destruction of the motor fibers. A hemiplegia of this character could likewise be

explained as due to thalamic involvement, especially with the later development of hyperesthesia over the left half of the body.

A very interesting phenomenon was, on the hemiplegic side, diminished knee jerk with which there was later associated the extensor toe reflex, or Babinski sign. This is a rare association in organic growths and we believe may be explained as the result of interference with impulses passing along the spinal thalamic system. It cannot be explained by indirect pressure on the cerebellum, or by pressure on the spinal roots through internal hydrocephalus. A diminished knee jerk cannot in this case be explained by contractures of the opposing muscles, or by atrophy of the quadriceps extensor group. The explanation usually given for the absence or diminution of knee jerks in brain tumors, increase in pressure upon the spinal roots because of the increase of tension of the cerebro-spinal fluid, is not borne out by the absence of this phenomenon in the case of A. S. here reported in which the contents of the posterior fossa were in part forced into the foramen magnum by pressure.

The fact that improvement under salvarsan and mercury was for a time markedly progressive leading to a diagnosis of the probable specificity of the disease, shows the need of care in such conclusions. Repeated negative Wassermann blood and spinal fluid speak emphatically against syphilis. The development of a tremor of the right upper extremity, strongly suggesting the tremor of paralysis agitans and yet intensified on attempts at voluntary movement, spoke for a midbrain tumor. On the other hand, though not having the characteristics of frontal lobe tumor, it is barely possible, considering the anatomical location of the growth, that the frontal lobe was responsible for this motor symptom. There is, however, but little doubt but that it was due to midbrain pressure. Here again, like many other late manifestations, its value for localization is diminished and, as a symptom, misleading.

The diagnosis of a deep seated neoplasm involving the thalamus and tracts was certainly justified by the characteristic thalamic syndrome of left homonymous hemianopsia; fine, rapid tremor of the right hand, left hemiplegia, with left paresis in facial mimicry doubtless due to pressure on the pulvinar.

The later hallucinations or illusions, though transitory, were due to further involvement of, or pressure upon, the frontal lobes. When surgical relief is attempted in indefinite lesions, this is only

one of the many cases that illustrate the need of operating directly over the probable site of the tumor and of making careful examination of the brain surface and environment as far as possible including free use of the aspirating needle for finding pathological tissue. It was found post mortem that the operation for corpus callosum puncture was directly over the seat of the lesion and the growth might readily have been enucleated; on account of profuse bleeding, the investigation was not carried far enough since it was thought that the hemorrhage was of osseous origin as it was not known that the tumor was directly beneath.

CASE 2.—J. K., aged 49, first symptoms 1910, died Feb. 21, 1914, family and personal history unimportant. This case was in the service of Dr. Abrahamson to whom we are indebted for the privilege of utilizing the status made by him.

While eating a sour pickle patient was suddenly unable to swallow, coughed a few times and became unconscious for half an hour. Two weeks later there followed a paresis of the left lower limb. The next symptom developed a year later when the right leg was similarly affected and, shortly after, the left arm. There were also observed at this time some disturbances in respiration and in speech though the nature of this was not noted.

During the year preceding death, the symptoms were diplopia; headaches and paresthesia of the lower extremities; fibrillary twitchings with crenation of tongue; frequent and annoying eructations, independent of food and in the nature of a spasmodic contraction; memory for past events defective; a series of clonic convulsions involving the left face, right upper and lower extremities without loss of consciousness; the lower limbs showed characteristic spasticity, double ankle and patella clonus with double Babinski and active abdominals; right pupil was irregular and reacted sluggishly; there was some ataxia in the left upper extremity and disturbance of postural and stereognostic sense.

Blood Wassermann was strongly positive. Lumbar puncture was absolutely refused by patient. Within a day or two before death patient became irrational. The eye grounds, even so late as a month previous to exitus, showed right fundus normal; in the left dilated veins and clouding of the disc. Death was due to sepsis.

The pathological nerve findings are as follows:

Skull.—In the median line, just anterior to the bregma, there is a spherical elevation about three inches in diameter causing a distinct prominence of the skull. The latter is very smooth in outline. The interior of the skull cap, corresponding to the area of bony enlargement, is much roughened and firmly adherent to the dura. This hypertrophy is not hard, can be easily incised to a depth of about ¼ inch on the inside and on the outer surface to

about ⅛ inch depth.   Between these two soft layers is solid bone.
   Brain.—Outer surface of the dura corresponding to the bony
condition described is roughened, thickened, jagged.   The dura
is adherent to the cortex of the brain over both hemispheres from

Fig. 3.   J. K.   Sections of hemispheres showing infiltrating endothelioma
growing almost symmetrically.

the end of the superior frontal convolution almost to the occipital
lobe posteriorly.
   In the fresh specimen what now shows as a somewhat solid
tumor mass really looked like a mass of infiltrating material ex-
tending almost in butterfly form symmetrically along the median
line into the hemispheres, practically obliterating in part the longi-
tudinal sinus.   The tumor mass involves almost entirely the right
parietal lobe, the two halves of the tumor fusing in the middle
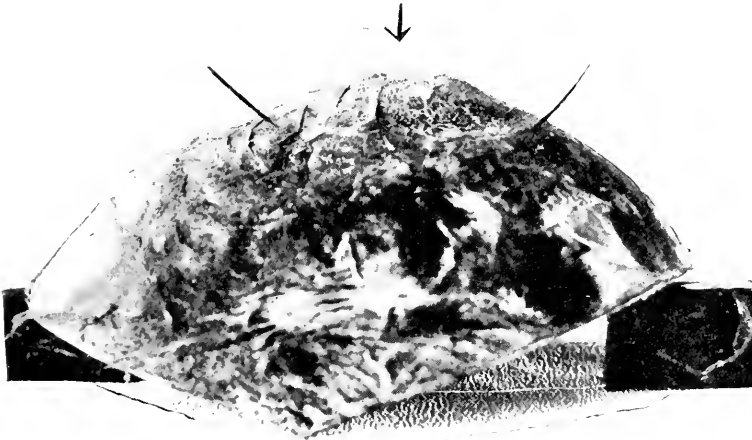
Fig. 4.   J. K.   Showing hypertrophic osteitis over the parietal bones at
vertex.

line.   The cortical leg centers on both sides are almost obliterated;
posteriorly the growth has a distinctly infiltrating character and
reaches almost to the corpus callosum.   In the gross fresh speci-
men the tumor had somewhat the appearance of a large gumma,
but shows microscopically to be an endothelioma.

In contrast to the specimen previously shown,, also an endothelioma, this tumor could not have been excised completely.

[Path. Note. Histologically this tumor belongs to endotheliomata, but in many places the cells are massed together; all are cuboidal in shape; the nuclei show mitotic figures and there is an invasion of the dura and pia and the latter are very much thickened; throughout the growth are seen many arterioles which are very markedly sclerotic, some entirely obliterated by the endarteritis. At the periphery of the growth the brain substance is infiltrated with masses of endothelial cells. This is an endothelioma with malignant changes. There is also an endarteritis, probably of syphilitic origin.]

An interesting feature of this case lies in the fact that both the tumor of the brain and the osteitis of the skull entirely escaped clinical recognition.

Throughout the history of the case, two etiological factors were operative: one, the development of the neoplasm; the other the influence of the specific element. An analysis of the clinical history as compared with the pathological findings enables one to make some differentiation. The symptoms due to general specific involvement were especially those involving the basal nuclei; difficulty in swallowing, speech and respiration; fibrillary twitchings with crenation of the tongue; frequent and annoying eructations, doubtless due to spasmodic contraction of the diaphragm. Disturbances in the intellectual field, involving memory, with perhaps likewise the pupillary differences, may also be regarded as symptoms due to specific involvement of the nervous system.

The focalizing symptoms, those due to the neoplasm, were those involving the extremities, beginning with the paresis of the left lower limb and progressing in anatomical sequence. Of further interest was the absence of optic disc involvement, in spite of a neoplasm of such large size, until very late in the disease. In this case, as in the case of S. L. and in many reported by others, it is evident that one cannot be guided too closely by changes in the optic disc. Further, this case is analogous to the one just mentioned in that it shows that there may be large intracranial growth with but little that suggests the general symptoms of tumor. A glance at the specimen indicates how extensive may be the destruction of the longitudinal sinus without manifestations.

Just what influence there was upon the development of the growth from the presence of the specific element, one cannot de-

termine. The vessels in the growth itself, however, show a tendency to obliterative endarteritis. The decidely malignant character is distinctly shown at its periphery. There is a peculiarly suggestive symmetry in the development of the growth with its butterfly wing form of extension on either side of the middle line; it may be largely due to the circulatory disturbances of a specific nature. The extensive infiltration precluded the possibility of operative relief.

In the gross specimen, the neoplasm might very easily have been mistaken for a large gumma. The pathological changes in the skull were of the nature of a hypertrophic osteitis. An interesting question is the relationship of the pathological changes in the skull to the intracranial lesion; the osseus changes were not distinctly of a specific character and it is not unlikely that the process was secondary stimulation in growth given to the cranial vault by an underlying neoplasm.

CASE 3.—S. S., aged 40, died Nov. 16, 1912.

Family history shows nothing of interest; personal history likewise. A relevant fact is the mental infirmity of two of the patient's children, one of whom is now at Randall's Island. The earliest history we have of the present illness dates back four years. The onset is described as a sudden, burning pain in the right upper extremity beginning in the tips of the fingers and extending upward as far as the shoulder. There were also "sticking pains" in the right side of the face; the mouth was pulled to the right side. The convulsive attacks always began in the thumb of the right hand. It was further observed that several minutes before the attack a peculiar sensation was felt in the anterior mid-parietal region. With this sensation as a warning, or aura, the patient would be enabled to seek a place of safety. He would then give a cry and go into general convulsions.

After the first attack he remained in bed several days and was attended by a physician. It is also recorded that the convulsive movements passed consecutively from the right thumb, to forearm and arm, face and right leg. In later attacks the left leg was included in the seizure and finally the left face. After the first attack the patient remained well for several weeks. The seizures coming on at first every two months steadily increased so that four years after the initial seizure the paroxysms averaged several daily. After the initial attack there was a transitory weakness in the right upper extremity. This weakness became pronounced about four years later and then retrogressed. Simultaneously there were marked cyanosis and edema of this extremity and this likewise was transitory.

A noticeable weakness of both legs several years subsequent to the onset of the symptoms showed a decidedly spontaneous improvement. The patient related that examinations for sensory disturbances made previous to 1910 showed no abnormalities. Likewise for some time previous to admission there were attacks of vertigo and headaches not localized. Beginning some four years after the initial symptoms there appeared clonic spasms of the left platysma and lower face, causing the drawing of the left side of the mouth and contractures of the muscles of the left side of the neck.

The patient relates that in 1909 his " right hand felt very nervous " as he expressed it ; he could not bear to touch it, but felt no numbness and no tremor. The patient also described a peculiar, subjective feeling, referred to the eyes ; it seemed to him as though his eyes were as " a cat's eyes in the dark." Shortly after admission to the hospital a number of epileptic seizures were observed. These were at times confined almost entirely to the right side, as previously described. This was followed by exaggerated deep reflexes and Babinski on the right side and ankle clonus. During the several months after admission to the Montefiore Home and Hospital, that is from June to October, 1910, convulsions, as described, were frequent. At this time the seizures were not preceded by sensory aura and invariably began in the thumb and second finger of the right hand to which at times the convulsive movement would be confined. There were likewise observed at this time occasional convulsive movements of the right eyelid ; likewise spasmodic contractions of the left platysma and sternomastoid turning the head strongly to the right. It was seen that the convulsive paroxysm often terminated with contractures of the left platysma muscle. At times athetoid movements of the right upper extremity were observed.

In September, 1910, that is a few months after admission, the following notes were made : Of the cranial nerves, the first, third, fourth, fifth, sixth, eighth, ninth and tenth normal. There was a constant twitching of the sterno-cleido mastoid. There were constant convulsive movements of the left side of the face ; the protruded tongue deviated to the right. The fundi of the eyes showed a suggestion of neuroretinitis. The abdominal, epigastric and cremasteric reflexes were lively on both sides. There was no Babinski, Oppenheim, Gordon, or Mendel sign. Right wrist jerk was exaggerated and there was markedly increased knee jerk with ankle clonus on the right side. There was no astereognosis. There was diminished power with tendency to contracture in right upper and lower extremities. What is described as " an intention tremor " was observed in the right hand. No sensory disturbances.

Notes made in November, 1910, by some observers resulted in the case being regarded as a functional one. It was presumed

that many of the symptoms were exaggerated and, in fact, feigned. Apparent confirmation was given this theory by very marked improvement in all the symptoms in January, 1911. The first suspicion that the case was purely of an organic nature was in the latter part of January, 1911. The great variability of the symptoms, affecting especially the spasticity of the right leg, and of the emotional variability in the patient which in itself seemed markedly to affect the intensity of the spasms of the muscles of the left side of the neck caused the erroneous conclusions.

In January, 1911, the case was regarded as one of probable gliosis of the brain. In April, 1912, mental symptoms were ob-

FIG. 5. S. S. Section showing gliosarcoma in the left hemisphere just under and involving the cortex. The cavity appearance is due to the breaking down of the tumor mass.

served, consisting particularly of confusion. At the same time there was observed also spasmodic twitchings of both upper lids in both facials. There was also a marked clonic spasm of the left lower facial, likewise rigidity and flexion at the elbow joint of the right arm and clonic spasms in both forearms and hands.

Patient died November 16, 1912, in general convulsions.

The pathological findings are as follows: Tumor is seen in the left hemisphere involving the cortex. Anteriorly it involves the second frontal convolution and is about one inch from the longitudinal fissure. Extending posteriorly it involves the cortex for about two inches just reaching the ascending frontal convolution. Further, it extends inferiorly for about two inches pressing upon the first temporal convolution. The growth likewise descends into the depths of the hemisphere infiltrating the whole substance and destroying the portion of the corona radiata fibers coming from frontal and in part also those from the ascending frontal and parietal areas.

The tumor in its posterior third becomes entirely subcortical, excavating the brain substance and leaving only a shell of cortex about one-eighth of an inch in thickness. Thus the tumor extends directly into the hemisphere for a distance of two inches. The excavated portion is oval in shape, its longer dimension being antero-posteriorly.

The dimensions of the growth are: anterior-posterior diameter 3⅞ inches; lateral diameter 2 inches; vertical dimension 1¼ inch.

[Path. Note.—This growth consists of very closely packed minute cells, having darkly stained nuclei. The cells infiltrate the brain substance. Cells can be seen having very much larger cell bodies than others and these show likewise multipolar processes stretching out between other adjacent cells. The growth is a gliosarcoma.]

Although the initial symptoms were of an epileptic nature and the case was regarded as such for some time, it is another example emphasizing the need of great care in making the diagnosis of a true epilepsy in a patient who has reached middle life without a history of previous attacks, though these may have been so far back as infancy.

The initial symptom was of a sensory character; that is, localized paresthesia, corresponding however to the primary motor involvement. The anatomical situation of the tumor is far anterior to the generally recognized seat of sensation in the cortical or subcortical region. This early sensory symptom, therefore, doubtless the result of direct irritation, speaks strongly for the presence of a certain degree of sense perception in the motor zone. This we believe is entirely in accord with the fact that a motor cell being stimulated by an afferent fiber must of itself be possessed of some sensory quality. This is further demonstrated by observations in the true epilepsies where sensory aurae sometimes precede motor symptoms and doubtless start from direct impulses in the motor area as in the case under discussion.

We frequently observe paresthesia and even pain immediately precede a convulsive attack of the painful member. The peculiar sensation of pain, felt by the patient just preceding the convulsive attack, was doubtless of a referred character and due to meningeal irritation. The sensation was very nearly over the seat of the tumor. This symptom having been present as a very early manifestation points to a cortical rather than subcortical starting point. It will be observed that later the growth descended into the depths. This further emphasizes the importance of percussion of the skull for tenderness. The fact that the initial seizures began in the area affected by the neoplasm and then became general, well illustrates the familiar observation that for diagnostic localization the initial member affected points to the seat of lesion. The edema and particularly the cyanosis in the right upper extremity, transitory and

occurring under these conditions, are strongly suggestive of an organic cerebral lesion and must be regarded as an important diagnostic sign.

The only general symptoms of neoplasm previous to admission to the hospital were paroxysms of headache and vertigo. These were not recognized at the time as associated with organic intracranial trouble.

A splendid example of Monakow's diaschisis is afforded by the involvement, as the tumor progressed, of the motor area on the side of the lesion; there were clonic-tonic spasms of the muscles of the left face and neck due to the irritation of the cortical representation of these muscles. Thus the stimulation passed by diaschisis to a corresponding localized area in the opposite hemisphere. Another symptom to be explained either by edema or diaschisis was the thalamic sign of the abnormal sensation felt by the patient in his right hand; he " could not bear to touch the hand; it felt very nervous." In conjunction with this symptom we have the associated thalamic sign, athetoid movements of the right upper extremity.

For several years following the initial symptoms, because of the associated functional manifestations due to an emotional temperament, the organic nature of the disease was masked. However, paroxysmal seizures of headache and vertigo, later with a low grade of neuro-retinitis, should surely have suggested organic disease. It behooves us once more to call attention to this point, namely that organic symptoms may easily be overshadowed by a variety of functional manifestations so frequently found in patients the subject of organic nervous disease. Psychic symptoms consisting essentially of confusion of ideas, a rare form of psychic manifestation in a lesion of this character and position, were observed as only transitory and very late in the progress of the disease. Doubtless true psychic symptoms may be expected only when both frontal lobes are involved.

CASE 4.—Miss A. S., aged 25, admitted to the Montefiore Home and Hospital April 4, 1911, died Sept. 28, 1913. This case was from the service of Dr. Abrahamson whose diagnosis in the case was correct. His status is utilized in our report. Family and personal history show no etiological bearing on the subject of our present study.

The first manifestations associated with the illness that caused her death appeared in 1909 as slight frontal headaches; these were

paroxysmal and became more intense. There followed short attacks
of unconsciousness during which there were convulsive twitchings
of the right facial muscles.   These attacks were sometimes pre-
ceded by transitory blindness; almost invariably as a kind of aura,
epigastric distress and vertigo.   There were likewise occasional
occipital headaches and transitory periods in which the gait was at
times ataxic and sometimes staggering with a tendency to fall to
the right.   Early in the course of the illness there was sudden but
temporary failure or dimness of vision.   With the first year almost
total blindness supervened.   A conspicuous symptom rather early
in the course of the disease process was attacks of extreme weari-
ness and somnolence.

About a year after the initial symptoms a fundus examination
disclosed marked papillitis with pronounced edema, especially of
the right eye, and signs of beginning secondary atrophy in the left.
The left pupil was large and not responsive; the right small with
little or no reaction.   An X-ray examination showed destruction
of the sella turcica with probable separation of the skull sutures
and rarefaction of the frontal bones—evidence of intracranial
pressure.   In the course of a few months subsequently there de-
veloped nystagmus in both external positions.   Because of the
rapid advancement in symptoms a subtemporal decompression was
done at the Mt. Sinai Hospital about a year after the onset of the
illness.   On November 3, 1910, horseshoe incision was made, three
inches from the base to apex, in the left temporal region.   Bone
flap was removed.   There was much bulging of the brain but mani-
fest pulsation.   There followed hernia cerebri.   Microscopical
examination of the cortical tissue removed showed normal brain
substance.   Aspiration over the site of the field of operation, about
1½ years later, revealed the presence of cysts containing a clear,
yellowish fluid.   The latter congealed in a short time, forcing to
the surface a thin fluid which boiled solid.

Olfactory nerve degeneration manifested itself by progressive
anosmia, the sense of smell being more rapidly lost on the left side.
During the course of this deterioration there developed symptoms
similar to an acute coryza.   Sight was reduced to differentiation
between light and darkness, but this perception was finally con-
fined to the nasal sides of the retinæ.   Over the trigeminal nerve
distribution all forms of sensation remained intact and the corneal
reflexes normal.   There was later temporary paresthesia in the
form of numbness over the left facial area.   The third, fourth
and sixth cranial nerves preserved their functions.   At one time
the left acoustic became temporarily involved; its affection was
transient and not definitely ascertained.

In April, 1911, some two years after the onset of the illness,
there was found complete optic atrophy without evidence of for-
mer choked disc.   There developed also weakness of the right
facial innervation and some ataxia of the right upper extremity.

The right abdominal reflex was less active than the left. A fine, rapid tremor developed in both hands. There were no astereonosis, adiadochokinesis, or apraxia. A marked psychic symptom, a pronounced euphoria and especially Witzelsucht, tendency to more or less constant drollery, developed during the second year of the disease. Intelligence remained absolutely preserved.

One night during September, 1911, the patient suddenly awoke with loud screams and calls for help. She stated that on attempting to turn from the left side, on which she usually slept, towards the right she suddenly felt her mouth drawn strongly to the right side. Her tongue was twitching and pulling in the same direction. The right arm became stiff and the entire right side was involved in strong clonic convulsive movements. The only medication given was a suppository of opium and though fearing a repetition of the attack the patient was free from symptoms of that kind on the day following.

There was very little change in the somatic symptoms of the patient except that her general nutrition became gradually poor. Some ten months before her death her mental condition began to
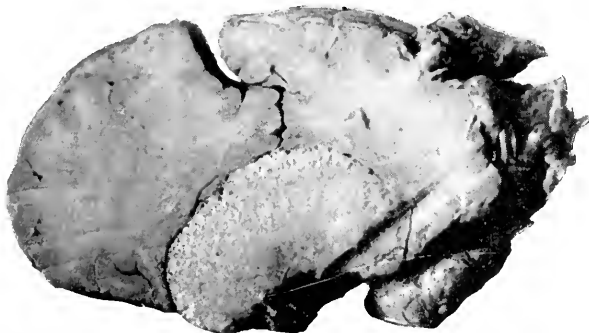
Fig. 6. Miss A. S. Section through frontal lobe showing large endothelioma beginning at the base.

show signs of deterioration. The hernial mass at the site of the operation for subtemporal decompression began gradually to increase in size. With rapid mental deterioration and constant loss of body weight the patient had a series of convulsive seizures with loss of consciousness, in one of which she died in September, 1913.

The cerebral hernia was found to be in part a thin cyst wall containing clear colorless fluid; the brain substance at the site of operation softened and cystic; the base of the brain flattened; right cerebellum jammed into the foramen magnum causing a depression in the brain substance. In front of the temporal lobe, at the base and extending from the chiasm forward there was a cauliflower-like growth about the size of a hen's egg, situated at the base of the brain, compressing and destroying both olfactory lobes

and optic nerves. The growth is symmetrically situated, its middle corresponding to the longitudinal groove, its anterior border extending ¼ of an inch beyond that of the brain itself.

Posteriorly it extends to a point corresponding to the Sylvian fissure. Its greatest width is at the level of the first frontal convolution on either side.

The growth measures about 2½ inches antero-posteriorly and 3 inches laterally. It extends upwards, compresses and practically destroys the corpus callosum anteriorly. The tumor is well circumscribed and can be easily separated from the brain tissue proper. The important structures practically destroyed by the tumor comprise: (1) Olfactory lobes and tracts, (2) Optic nerves and chiasm, (3) Pituitary body, (4) Frontal convolutions on both sides and some of the fibers of the corona radiata, (5) Anterior portion of the corpus callosum. Oculo-motor nerves of both sides and also the crura cerebri show macroscopically the effects of pressure.

The initial symptoms point most definitely to the localization of the growth. It is not unlikely that this case is one of neoplasm originating in the sheath of the optic nerve. The paroxysmal frontal headaches with somnolence and transitory blindness, the somewhat later involvement of both olfactory nerves, should have immediately suggested the true localization. It is interesting to observe that the X-ray examination, while showing destruction of the sella turcica, awakened the suspicion that the growth might be a hypophysis tumor. A further suggestion of the pituitary as the site of the lesion was given by the nature of the retinal field picture since the perception of light was finally confined to the nasal sides. X-ray findings in pituitary growths must be guardedly interpreted. Corresponding to the irritative symptom, that is papillitis from involvement of the optic nerves (through pressure, probably, on the nerve sheath) there was the interesting analogous signs of irritation of the olfactory in the forms of symptoms almost identical with an acute coryza.

With the upward extension of the growth into the frontal lobes the characteristic Witzelsucht developed. In spite of the initial symptoms pointing distinctly to anterior brain involvement at the base, the transitory ataxia, with a tendency to fall to the right, likewise the occipital headaches, suggest of course posterior fossa involvement. As Bruns has pointed out, however, we may have a typical frontal lobe ataxia; this symptom having occurred early in the disease was probably not due to the jamming of the cere-

bellum into the foramen magnum. It is probable that this latter
condition was due to the formation of cysts at the site of the de-
compression. In either case it is evident that for this process of
posterior fossa contents being forced into the foramen, it is not
necessary that there be a very great increase in intracranial
pressure.

It is remarkable likewise that with this involvement of cere-
bellar tissue by direct pressure, really no symptoms pointing to
these parts obtrusively developed.

CASE 5.—I. S. From the service of Dr. Abrahamson whose
notes of the case we are permitted to utilize. The growth was
correctly localized. Admitted to Montefiore Home and Hospital
March 10, 1902. Family history gives but one relevant factor;
the death of the patient's father of tuberculosis. His early per-
sonal history affords no important data.

For some years prior to the development of his intracranial
symptoms he suffered from extensive pulmonary disease of a
tuberculous nature and from about the same time also from severe
attacks of migraine of right hemicranium, the paroxysms occur-
ring about once in two weeks. A year after the beginning of the
migraine attacks the right eye in toto showed inflammatory stasis
doubtless due to post orbital venous congestion. This was fol-
lowed by a gradual diminution of sight, the eyeball protruding
progressively from the orbit. The pain about the eyeball and its
protrusion became so pronounced as to necessitate enucleation,
after which the acute symptoms subsided until within a few weeks
preceding death. The only other symptoms recorded suggesting
an intracranial growth were occasional general epileptiform sei-
zures observed for a period of a few months preceding death.
Circumstances made it unfortunately impossible to secure a com-
plete history of this case.

The intracranial pathological condition as observed post mor-
tem is as follows:

The skull cap is thin; its interior smooth. Convolutions of
the brain are much flattened. The right side of the anterior fossa
shows a large white endotheliomatous growth evidently having
origin from the posterior portion of the optic plate, growing di-
rectly into the brain substance, involving the right inferior frontal
convolution, the right olfactory bulb and the chiasm.

The dilation of the right lateral ventricle is enormous and is
seen to compress the lateral surface of the frontal and anterior
portion of the parietal lobe so as to cause a bulging of the surface
across the middle line, distorting the opposite or left hemisphere.
The tempero-sphenoidal lobe is compressed and markedly thin so
that the ventricular wall reaches the cortical layer of gray matter.
The central ganglia are pressed upon and distorted toward the left.

Looked at from above, the right hemisphere in its anterior half
appears enlarged as compared to the left hemisphere. It is likely
that this apparent enlargement is due to the immense hydroceph-
alus of the left side. This one-sided hydrocephalus can only be
explained on the assumption that the opening from the third ven-
tricle into the left lateral ventricle was closed by the compressing
influence either of the tumor or of the change caused by the un-
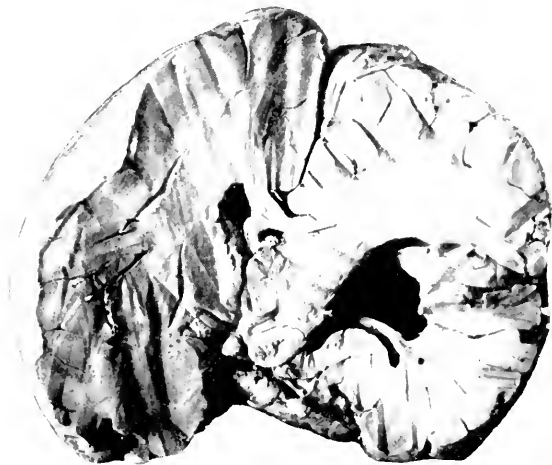
FIG. 7. I. S. Section showing dilatation of right ventricle.

equal amount of fluid in the two ventricles. It is possible that
there was a unilateral inflammatory process which closed the
foramen of Monro on the left side. This growth presents a
classical picture of psammoma. Whorls of spindle cells are ar-
ranged around a central psammoma.

It is remarkable that in spite of this large growth at the base
and of the enormous dilatation of the lateral ventricle exerting
direct pressure on important brain structures, the neurological
symptoms were by no means of an obtrusive character. Indeed,
intracranial lesion was not suspected although the case had been
under observation by competent internists. Although not exam-
ined by a neurologist, one would surely have expected emphatic
clinical evidence of a brain lesion in a case in which the intra-
cranial pathological findings were so extensive. It is worthy of
note, therefore, that clinical manifestations were not present.

Nevertheless, the case emphasizes the need of early, careful,
neurological status; further, the need of an awakening suspicion
of organic changes in some part of the nervous system, most likely
frontal, in a case of intense migraine and incorrectable loss of
vision, especially beginning after middle life.

CASE 6.—D. L., admitted to Montefiore Home and Hospital December 12, 1913.

The history is interesting in showing the direct relationship between extensive involvement of the lungs with tubercular disease and the later development of laryngeal tuberculosis with final tubercles in the brain. The earliest symptom we have of brain lesion was severe occipital pain antedating by about four years the development of intense vertigo on change from horizontal to a vertical position. There were likewise occasional attacks of nausea and headache. Vertigo, the most prominent symptom, was in this case characterized by its presence and intensity only during change of position. Finally, associated with the vertigo, were attacks of perspiration and prostration.

Macroscopically the brain findings were as follows: Marked congestion of the dura with cerebral veins greatly engorged. There was some edema of the pia. The lateral ventricles were much dilated and filled with fluid. There was found in the right lateral ventricle anteriorly a tubercular nodule of the size of a large pea immediately under the ependyma. The base of the brain was
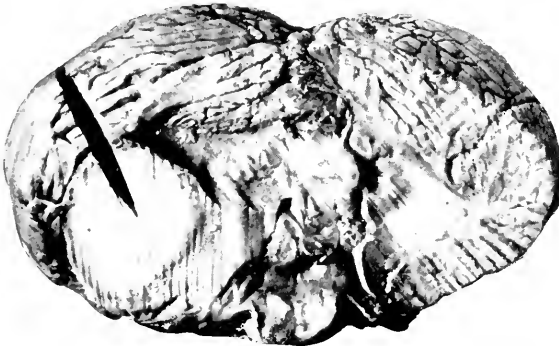
FIG. 8. D. L. Section through the cerebellum showing large tuberculoma in the right cerebellar hemisphere. Black cleft through growth is artefact.

normal. Both lateral lobes of the cerebellum showed semilunar depressions from having been jammed into the foramen magnum. In the right cerebellar hemisphere a large, hard growth was found about the size of a large pigeon's egg. Histologically, the neoplasm is a typical tuberculoma with central caseation, peripheral round cells and giant cells. There is no meningitic process about the mass.

CASE 7.—Mrs. H. G., aged 65, died October 27, 1911. Personal and family history have no bearing on the neurological findings.

The interest in this case lies in the pathological finding, post

mortem, of a tumor of the left frontal lobe extending upward from the base; it is an endothelioma, size of a pigeon's egg. The presence of the tumor was never suspected having given rise to no subjective complaints though the growth pressed both upon the left olfactory and the left optic nerves; macroscopically one sees that the left optic nerve is of far lesser diameter than the right. There is an area of softening involving the left internal capsule which accounts for the sudden hemiplegia of the right side which came on instantly with loss of consciousness three months previous to admission to the Montefiore Hospital.

Repeated neurological examinations did not point to intracranial growth. The hemiplegic syndrome was of course due to the vascular lesion within the internal capsule. Examination of the cranial nerves as made at the time was negative. The bedside record shows a careful examination of all the cranial nerves, but no mention is made of involvement of either of the olfactory nerves. The left eyeball had been enucleated, previous to admission, hence of course the very important symptoms both of the peripheral organ and the optic nerve itself were not obtained for record. In all probability the enucleation was due to ocular symptoms not recognized as of intracranial origin. That the olfactory involvement did not betray itself to clinical observation probably was due to the uncertainty of interpretation of such an isolated symptom as a unilateral anosmia. It is probable that the tumor had its inception in the optic nerve sheath and that the enucleation of the eye was done because of the protrusion of the eyeball. Tumors of the optic nerve are rare and doubtless easily overlooked.

[Path. Note. The brain in toto was remarkably small; indeed, appeared microcephalic. The convolutions, however, showed no atrophy; the diminutive proportions could not be ascribed to atrophic senile changes.]

The growth consists of spindle cells arranged concentrically, densely packed together. The nuclei stain intensely, the protoplasms faintly. There are very few vessels and these are dilated. Occasionally throughout the specimen psammoma material is seen. This picture is that of a classical endothelioma. To Drs. Abrahamson, Strauss and Hunt we beg to asknowledge our thanks for the privilege of utilizing some of their material.

COMBINED PSYCHOSES

By John E. Lind, M.D.

GOVERNMENT HOSPITAL FOR THE INSANE, WASHINGTON, D. C.

A review of the literature of combined psychoses for the past thirty years reveals a surprising paucity of material. I have only been able to find a scant twenty-seven articles bearing on the subject, and some of these only deal with it indirectly. Here and there in the standard works on psychiatry are found allusions to the possibility of the existence of combinations, but only incidentally as it were. I shall not attempt to review or abstract this literature at any length for the number of case histories which I wish to touch upon will fill all the available space. Suffice it to say that it seems to be the opinion of psychiatrists in general that combined psychoses are fairly frequent, far more so than would appear by the published reports of such instances. Nosological fashions have been so mutable in the past few decades that it is often hard to tell whether a writer is referring to a different psychosis from the one which the reader had in mind or is merely using a different name. Something of the difficulty which attends the investigation of this subject even in the records of a single hospital will be mentioned below.

Appended to this article will be found a bibliography as nearly complete as I have been able to make it; I shall only mention briefly a few of the contributions most accessible to American readers. C. M. Campbell,[3] writing in 1882, describes twenty-two cases of typhoid fever occurring in insane patients, all women. Unfortunately he does not give a full enough clinical history in any case to warrant a diagnosis of infection-exhaustion psychosis engrafted on the preexisting condition. Such a state of affairs may be suspected, however, from the statement, " The mental symptoms were intensified during the first few days of the fever." H. R. Stedman,[22] writing in 1883, presents four cases which he calls instances of " change in the form of insanity during acute attacks." The first two cases in the light of our present day viewpoint appear to be manic-depressive psychoses in which the depressed

phase occurred first and was followed shortly by a manic episode. The third case was probably catatonic præcox and the fourth seems to have been a manic with excitements of varying degrees. R. P. Smith,[19] in 1887, reports six cases of typhoid fever in insane patients. Two of these cases were apparently manic and the onset of the illness was marked by a subsidence of the manic symptoms and the appearance of delirium.

J. W. Stevens,[23] in 1907, has shown most indubitably a case of Korsakoff's syndrome coexisting with the depressed phase of manic-depressive psychosis and a constitutional psychopathy underlying both these. Krafft-Ebing speaks of general paresis developing in paranoiacs. Of course here we stumble on the vexed question of what constitutes paranoia, and if we hold to the old " true paranoia " of Kraepelin, and insist on both the clinical and serological proofs of paresis, it is extremely doubtful whether any such case has been observed or not ; certainly I have found none reported in the literature, I recall none in my own experience and inquiry among psychiatrists of much larger experience than my own gives the same results. In 1911 Drs. Karpas and Poule[11] presented a case of dementia præcox with tabes to the New York Neurological Society for differential diagnosis from general paresis of tabetic type. In the discussion it was stated by Dr. Kirby that no such combination had ever been observed at the Manhattan State Hospital.

Oberndorf,[14] in 1912, describes psychoses occurring in constitutional inferiors and states that they all present anomalous features. He describes excitements and depressions, alcoholic episodes and præcox syndromes. Of course, strictly speaking, these cannot be called combined psychoses, unless we use the term psychosis in its broadest application, *i. e.*, the expression of an individual's abnormal reaction to a group of circumstances. Constitutional inferiority, psychopathy and other defective states are accompanied by excitements and depressions, especially the former and alcoholic episodes are to be expected, alcohol being the natural defense reaction in these conditions.

W. F. Lorenz,[12] in 1911, published a very good case of manic-depressive psychosis, infection with syphilis, and later on general paresis. Karl Graeter[7] in 1909 published a monograph dealing with the inter-relations of alcohol and dementia præcox in which are cases of alcoholic psychoses on a præcox foundation, and L.

L. Smith[19] found a number of such cases in investigating the cases of dementia præcox admitted to the Government Hospital for the Insane from the United States Army.

G. W. Gorrill,[7] in February, 1914, published in the New York State Hospital Bulletin five excellent cases of combined psychoses. His paper is the most noteworthy clinical contribution to the literature I have been able to find. His first case was a dementia præcox of thirty-three years' duration, who became infected with syphilis when fifty-one years old and about six years later developed general paresis, as evidenced by the clinical, neurological and serological findings. His second case was general paresis developing at the age of forty-four in a woman who had had two attacks of manic-depressive type, one at thirty-three and one at forty-one. His third case was a manic-depressive with a history of three attacks, one at nineteen, one at twenty-two and one at thirty-four, followed by general paresis at fifty-seven. Autopsy showed a paretic brain and arteriosclerosis. His fourth case was not so clearly defined: A man of forty-three years contracted syphilis at twenty-nine, developed an attack of acute excitement at thirty-seven from which he recovered in nine months and seemed well for over five years when he suddenly became excited again and showed a manic-depressive reaction with the physical signs and laboratory findings of general paresis. It is possible that his first attack may have been paresis, followed by a five-year remission of symptoms; the only information given about the physical signs in the first attack is that the reflexes were exaggerated, his pupils reacted sluggishly to both light and accommodation and there was some tremor of tongue and fingers. The fifth case was a woman who had manic-depressive psychosis, one attack at twenty-six, another at forty-four, then at fifty-three an infection-exhaustion psychosis. There appears to be no doubt about this diagnosis.

The views of present-day writers in regard to combined psychoses are only found here and there, expressed in the course of articles dealing primarily with other subjects. In an article in the JOURNAL OF NERVOUS AND MENTAL DISEASE, in 1906, Dr. W. A. White, referring to clinical types, says, " They are not clean-cut entities, but are only groups of symptoms which either seem to occur more frequently in combinations or else have been more definitely and clearly seen because of the nature of their combinations. . . .

The great mass of cases seen are in combinations more or less inter-
mediate in character. . . . There are combinations . . . which are
quite frequent and which have only received inadequate notice
and even for the most part go unrecognized."[26] In another place
in the same article: "Because a person has manic-depressive in-
sanity is no reason he should be immune from the ordinary dis-
eases that affect the brain and impair the mind. . . . Thus we
find the paranoia syndrome in manic-depressive insanity, dementia
præcox and paresis; flight of ideas in dementia præcox; the Kor-
sakoff syndrome in senescence and paresis; the presbyophrenic
syndrome in paresis; katatonic rigidity and negativism in the
toxic-exhaustive psychoses, and so on indefinitely."

Dr. E. E. Southard* says in regard to the question of com-
bined psychoses, "I would say on theoretical grounds what I sup-
pose most any of us would say, namely, that the postulate of
combined psychoses may often be found to depend upon the pri-
ori selection of certain phenomena as constituting an entity, and
then finding that entity alongside others in a different case. This,
of course, would not constitute a logically rigorous proof of com-
bination of psychoses. On the whole, however, having abundant
faith in the future of our science and the confidence that there
are multiple causes which may bring about psychopathic phenom-
ena, I must say that I believe that the future will produce good
and convincing proofs of the combination of psychoses."

Looking at the subject in the abstract light of speculation we
may make the generalization that any two psychoses may occur
in the lifetime of an individual. For instance, a man may have
an episode of katatonia and recover, a few years later he may have
delirium tremens following prolonged alcoholism, he may recover
from this and be placed in an environment new to him and at the
same time meet with sexual difficulties from which he develops
a paranoid state with recovery. He may have typhoid fever and
an infection-exhaustion psychosis and lastly he may round out his
psychotic history by arteriosclerotic dementia and general paresis.
All this is of course merely an imaginative exercise, but as a
matter of fact there seems no reason why a toxic psychosis, for
example, should not develop in an imbecile, a præcox, a manic or
a paranoiac. Or, supposing any one of these four types becomes
infected with syphilis, is there any reason why he should not de-

* Extract from a letter to the writer

velop general paresis or cerebral lues? Arteriosclerotic or senile changes are without doubt present in a great many cases of imbecility and præcox which spend their lives in institutions and these terminal psychoses are not recognized clinically. The notes on such cases toward the end are to the effect that they " show much dilapidation " or are " deteriorating rapidly " and it is only post mortem that the superimposed conditions are recognized. There is too great a tendency, also, in taking anamneses of new admissions to take it for granted that if the patient relates a previous attack it is similar to the then existing one. Closer examination of the patient or application to his family, his physician or the hospital in which he was formerly treated may bring to light a totally different psychosis.

The generalization made above, like most generalizations, requires modifying. It is dependent on the assumption that a psychosis appears as the result of a certain group of psychic and physical factors acting upon an individual and if we suppose that these groups vary in properties and potentialities at different times we can suppose them producing different psychoses. On the other hand we must take into consideration the fact that the individual begins life with a certain biological legacy, he is a phylogenetic endproduct. Starting then with this distinctively individual endowment, he is acted upon by a constantly changing environment, the change being always in the direction of complexity. The first change is from the all pervading warmth and support of intrauterine life, unconditioned omnipotence, to the bright light and (comparative) cold of the outside world, from the complete fulfillment of all nutritive needs without conscious effort to the necessity for systematic and repeated exertions to secure the same result. From this first change the individual runs the gamut of complex situations until we find him an adult, coming into contact at a thousand points with his social heritage, a complex and exacting civilization.

We shall suppose that he adapts himself to the various requirements of life, moulding his environment here and there to suit certain individual psychic needs and occupies his niche in the social and business world with the minimum of friction. We have then an individual at least so far normal that he harmonizes with the general social scheme. Suppose, however, he fails to adapt himself when an exacting period of his life, such as the onset of

puberty, the first sexual experience, the first conflict with the business world or any other trying epoch calls for a readjustment of his scheme of things. The expression of his failure to react adequately we will call a psychosis and the symptomatology of this will depend upon his individual psychology, his make-up. Then, suppose him to have recovered from this psychosis, he again meets with a group of circumstances which call for extra psychic effort and he is again unequal to the situation. His expression of his failure would naturally take the same form, assuming of course the premise that the fundamental features of individual psychology are unalterable.

It is small wonder then that two such opposed methods of handling a situation as we find in the manic and in the præcox do not seem to occur in the same individual. In one case the libido, meeting with a bar to its progress, flows back upon itself and we have the reversion to earlier forms, the reanimation of old channels and the fixation at some point normally abandoned for good. This regression of the libido gives to the psychology of dementia præcox a peculiar aspect, the præcox lives within his self-created world which is admirably adapted to his psychic needs. He lies behind his self-erected fortifications and we can only surmise what activities take place there. The manic, however, pours his libido freely upon the outside world to divert attention from his psychic conflict, just as the garrison of a beleaguered fortress, threatened within by famine and mutiny, make sallies upon the besieging army. These antithetical modes of handling the difficulty are mutually exclusive and appear to be dependent on biological traits which are not altered to any extent during an individual's lifetime.

It will be interesting to observe whether or not the psychoanalytic method will make a change in this state of affairs. It does not seem impossible that some such state of affairs as this may obtain in the future. An individual may develop a præcox episode early in life and become aware of the source of his difficulty through psychoanalysis. His conflict being thus elevated to the surface of consciousness he may handle it successfully and take his place in the outside world. Meeting with a new difficulty years later he may develop a manic reaction, and so on.

The differential diagnosis between the dementia præcox and the manic-depressive psychoses has received its tons of printed trib-

ute to which I shall not add here. Enough to say that we have in the manic a quantitative deviation from normal and in the præcox a qualitative one. Hence it is that the præcox gives us a sense of strangeness while we find it easier to understand the manic's reaction. We can, so to speak, put ourselves in his place. On cross section there are cases which resemble both, but the longer they are observed the more readily they separate out. I have not been able to find dementia præcox and manic-depressive occurring in the lifetime of one individual.

The most common combination of psychoses appears to be an alcoholic psychosis engrafted on a præcox make-up. In fact this combination is so frequently seen that a natural doubt arises as to whether these are in reality alcoholic psychoses or whether they are not rather præcox episodes precipitated by alcohol. It is quite a common thing for instance in the Government Hospital for the Insane to receive a recently enlisted soldier diagnosed as an alcoholic psychosis or as a præcox caused by alcohol and find that the man is a præcox, probably of years' duration. The requirements of military discipline being too irksome for him, he took refuge in alcohol which accentuated the residuals of his old psychosis. I expect shortly to publish a paper dealing with this subject more fully. The relations between the two conditions are undoubtedly very intimate and it is questionable whether an alcoholic psychosis ever develops on a normal basis.

In investigating the subject of combined psychoses the records of the Government Hospital for the Insane from its establishment up to August 1, 1914, were reviewed, a total of 21,350 cases. From this number all those which had been readmitted to the hospital were extracted and only these were considered. This method is of course open to the objection that it does not cover cases which may have been treated in other hospitals for other psychoses or which may have passed through attacks not necessitating commitment. Such cases, however, would have to depend for diagnosis on descriptions given by the patient himself, often absolutely unreliable, the diagnosis made by a family physician, often unskilled in psychiatry or the routine method of examination and diagnosis in another hospital, often differing widely from the one used later on and dependent upon personal equations unknown to the writer. In going over the files 2,031 readmissions were found. Of this number a great many did not have sufficient clinical his-

tory during their earlier admissions to warrant a diagnosis. The staff in those days was not ample enough to permit of periodical notes on patients and such terms as "acute mania," "chronic mania," "acute dementia," "chronic dementia" and "acute melancholia" were in common use, terms which, needless to say, must be regarded as ambiguous now. When those cases from which no justifiable conclusions could be drawn as to their previous mental status had been weeded out there remained 808 cases with adequate histories of two or more admissions. These were all examined carefully. Many cases were thrown out which might perhaps without stretching the verities too far have been called combined psychoses, notably instances of præcox developing on a defective basis or alcoholic psychosis on a præcox basis. A large number of the cases consisted, of course, of attacks of manic-depressive psychoses. When the negative and doubtful cases were sifted out there remained 36 cases of combined psychoses and 5 cases of manic-like episodes in præcoxes. These 41 cases may be divided as follows:

Associated with Dementia Præcox

Alcoholic psychosis	6
Imbecility	3
Arteriosclerotic dementia	2
Infection-exhaustion psychosis	2
Hysteria	1
Total	14

Associated with Manic-Depressive

Senile dementia	4
Alcoholic psychosis	2
Arteriosclerotic dementia	2
Infection-exhaustion psychosis	1
Total	9

Other Combinations

Psychopathic character and prison psychosis	2
Arteriosclerotic dementia and infection-exhaustion psychosis	2
Senile dementia and alcoholic psychosis	1
Senile dementia and infection-exhaustion psychosis	1
Psychopathic character and alcoholic psychosis	1
Arteriosclerotic dementia and alcoholic psychosis	1
Prison psychosis and cerebral lues	1
Paranoid state and general paresis	1
Imbecility and arteriosclerotic dementia	1
Infection-exhaustion psychosis and paranoid state	1
Paranoia and senile dementia	1
Total	13
Cases resembling præcox and manic-depressive	5
Grand Total	41

Abstracts of all these 41 histories would occupy too much space so where there exists more than one similar combination I shall only abstract one case, the most clearly defined one, and mention the others only by number. The number used refers to the records of the Government Hospital for the Insane, cases being numbered in the order of their admission. The first group of cases to be considered is the one comprising combinations of alcoholic psychosis with dementia præcox.

CASE No. 15983.—A colored male, aged 40 years when admitted to the hospital May 26, 1906. He was first admitted to the hospital on October 12, 1901, and discharged May 30 of the following year as recovered from a psychosis due to alcoholism. The medical certificate which accompanied him on his second admission stated that the present attack began in May, 1906, by erratic conduct, noisy at night, carried stones in his pockets, manifested destructive tendencies and delusions of a mixed nature. Thought that by throwing money about the floor he could remove sins. Physical examination on admission was negative. Mentally clouding of consciousness was present, he was elated and restless, spoke of having talked with the Lord who told him to clean up this place from top to bottom, he saw the Lord at night and the Lord appeared to him in a vision. Ward notes for several days following his admission, described him as highly nervous, excited and restless. After two months he became quiet and worked out about the grounds. He remained in this condition six years and when examined in October, 1912, he was found emotionally indifferent, not caring whether he stayed in the hospital or went home to live with his family who were anxious to receive him. His memory was uncertain and apperception and retention decidedly impaired.

The above seems to have been a case of two alcoholic psychoses occurring in a simple præcox. Other cases of the combination of dementia præcox and alcoholic psychosis were Nos. 20453, 19783, 16187, 19633 and 20562.

CASE No. 16878.—A white female aged 33 on admission, November 7, 1907. Patient was always considered weak-minded and did not progress normally at school. When about 28 years of age she complained of men coming in a balloon to her room at night and molesting her. She would scream and cry and run out on the street. She was admitted here for the first time September 24, 1902, and discharged 16 days later as recovered. Soon after leaving she developed delusions that certain persons were casting spells over her and hypnotizing her and was readmitted October 1, 1904. Mental examination at that time showed auditory and visual hallucinations, delusions of persecution and feelings of influence. She improved somewhat and was discharged July 1, 1905. When readmitted in 1907 she showed no hallucinations or delusions, but a general mental reduction and periodic attacks of

excitement.   She remained in this condition and was finally dis-
charged to the care of her family February 23, 1911.

The above appears to be a case of two præcox episodes occur-
ring in a defective, probably an imbecile. On her third and last
admission, the diagnosis seems to be imbecility alone. Other cases
of præcox episodes occurring in imbeciles are Nos. 19128 and
18879.

CASE No. 4926 shows arteriosclerotic changes in a præcox. This
patient, a white female, was admitted to the hospital June 3, 1880,
being then 27 years of age. No systematic examination of the
case was made until December, 1903, when the physical examina-
tion was negative. Mental examination at that time showed par-
tial clouding of consciousness, auditory and tactile hallucinations
and delusions of persecution. A diagnosis of dementia præcox
was made. During the last year of her life she deteriorated
rapidly and sclerotic changes were noticed. In July, 1911, a cere-
bral hemorrhage occurred and she died the same day.

Another case of arteriosclerotic dementia in a præcox is Case
No. 21028.

CASE No. 15250 shows an infection-exhaustion psychosis fol-
lowed in four years by a præcox which may or may not have ex-
isted at the time of the first admission. The patient was a colored
female, admitted first September 3, 1904, suffering from a psy-
chosis following ill health and childbirth. The diagnosis recorded
then was acute confusional insanity and she was discharged as
recovered on October 28 of the same year. She was readmitted
on April 4, 1905; the mental examination then showed that she
was confused, disoriented, talked incoherently to herself, had hal-
lucinations of hearing and feared some one was going to harm
her. She was indifferent to her surroundings, cross and irritable
at times, memory defect, no insight, and reasoning and judgment
were impaired. A diagnosis of dementia præcox was made; the
autopsy four years later showed considerable shrinkage of the
brain with no gross lesions. Another instance of this same com-
bination is Case No. 19521.

CASE No. 18531 shows a hysteriform attack in a dementia præ-
cox. The patient, a white female, showed her first signs of mental
trouble in March, 1908, being at that time 27 years old. She
obtained a revolver and attempted to shoot herself, broke a win-
dow and tried to cut her throat, also attempted to strangle herself
with a handkerchief. She was admitted to the hospital on March
8, 1908. Mental examination showed apprehension, negativism,
restlessness, clouding of consciousness, depression and visual and
auditory hallucinations. She gradually improved and was dis-
charged as recovered from dementia præcox on January 29, 1909.
May 8, 1910, she suffered from a fainting attack and fell out of
her chair. Following this she had several fainting attacks and
appeared to be excited. She then became depressed and despon-

dent, complained of her tongue being thick and of inability to swallow, cried frequently without reason and took no interest in her household or her child. She was readmitted to the hospital on May 21, 1910, and showed no mental symptoms whatever, being discharged three weeks later as not insane.

CASE No. 16411 shows a manic-depressive case, complicated by senile changes. The patient was a colored female, aged 70 on her last admission, February 19, 1907. She had been a patient five times between 1895 and 1903, each time suffering from an excited phase of manic-depressive psychosis, with recovery. On her last admission she showed arteriosclerotic changes, was excited and remained so for several months. When she quieted down, she was found to have marked mental deterioration. From then on until her death in 1909 periods of excitement alternated with quiet intervals and during the latter she showed senile defects. Other cases showing senile dementia in manic-depressive types are Nos. 15399, 16168 and 15981.

CASE No. 19843 shows three attacks of manic-depressive psychosis, followed four years after the last one by an alcoholic psychosis. Patient is a white female, born in 1870. In 1900 she was treated in this hospital for one month, the diagnosis then being acute mania, discharged recovered. April 4, 1908, she was readmitted; mental examination showed her to be depressed and apprehensive. Consciousness was clear and she showed no delusions or hallucinations. She was discharged by the court nineteen days later and a diagnosis of manic-depressive insanity was made. May 5, 1908, she was readmitted with the same diagnosis and discharged four months later. In January, 1912, she began to drink heavily, was frequently intoxicated and on April 4 of that year she became voluble, resistive, removed her clothing and later became violent and entertained delusions of persecution directed against her relatives. She was readmitted to the hospital April 11 and was noisy, restless and confused. She continued in this state of confusion two days. At that time she had hallucinations of sight and hearing, imagined she saw animals and vermin on the wall of her room and would strike at imaginary objects on the wall. She remained in this condition about one week, when she became quieter, the hallucinations disappeared and mental examination revealed no psychotic symptoms. This is undoubtedly a case of delirium tremens occurring in a manic-depressive individual. Another example is Case No. 19641.

CASE No. 6729 shows a manic-depressive individual who later on developed dementia of an arteriosclerotic type, this diagnosis being confirmed by the autopsy findings. Patient was a white male, first admitted to the hospital in 1881 and again in 1886. Before this he had been treated in the Utica State Hospital. His age at his first admission was 41. The chief mental symptoms are given as depression with delusions of persecution, alternating

with periods of restlessness and exaltation. From 1902 on he demented and died in July, 1908, at the age of 68. Autopsy showed atrophy of the brain, opacity of pia and arteriosclerotic softenings. Case No. 20884 shows a similar combination.

CASE No. 20253 shows three attacks of what was probably manic-depressive psychosis, complicated in each instance by the excessive use of drugs and in the last one by an infection-exhaustion psychosis. The patient is a white female, born in 1868. In 1905 she was placed in a private sanitarium where she remained for nine months. Her mental condition while there is not known. After leaving she became addicted to the patent medicine habit and took vast quantities of these. In the summer of 1908 she attempted suicide on three occasions by taking laudanum. October 21, 1908, she was admitted to this hospital. Mental examination showed emotional depression, agitation and feeling of unreality; she thought her food was poisoned and that she had no bowels. This was succeeded by an excitement during which she broke dishes, threatened to kill herself, refused food and had to be tube-fed. She gradually improved and obtained good insight. On March 31, 1909, her case was considered at a conference of the medical staff and she was discharged recovered, April 3, 1909. She got along well, until July, 1910, when she began taking laudanum for pain in her side. She also took whiskey in large doses. She was readmitted to the hospital July 12, 1911, very much depressed, and discharged as recovered September 19, 1911. She got along well until the first part of September, 1912, when she began scolding her husband and nailing the doors so he could not enter the house. She would not allow anyone in the house and was active and talkative, working continually, canning and preserving until late in the night. She threatened to kill her husband with an ax, and would do nothing he requested of her. About this time, she developed a malarial attack and took a considerable amount of quinine. Following this, she had auditory hallucinations which excited her so it was necessary to commit her to this hospital. On admission she was quite disturbed, ran constantly about the dormitory, overturned the other patients' beds, talked to imaginary voices, approached the windows and called to the people passing by to come in and protect her. She continued this excited condition for about three weeks and then began gradually to improve. Mental examination at this time showed a flight of ideas, vague persecutory delusions concerning her husband, emotional depression but no clouding of consciousness or hallucinations. She was discharged as recovered on February 12, 1913.

A number of cases of the combination of prison psychosis with psychopathic constitution might be cited, in fact, it would seem to be the case that usually only those constitutionally predisposed,

develop such episodes. I have selected only two cases, and will quote briefly from one of them.

CASE No. 19440, white male born in 1885. The account of his school life was obtained from the patient himself, who stated that he was a bright scholar of unusual intellectual attainments. After leaving school he lost several situations on account of outbursts of temper, resulting in fights with other employes. He had several gonorrheal infections, the first one at the age of fifteen; was infected with syphilis at a very early age; used alcoholics to excess, and was intoxicated on numerous occasions. In the summer of 1909, he was arrested for robbery and released on bond which he forfeited by leaving the jurisdiction. When the police went to a nearby city to arrest him, he met them with a loaded pistol and it was necessary to use force to subdue him. At that time he was living on the earnings of a professional prostitute to whom he claimed to have been married for several years. Correspondence between him and this woman showed that he fully sanctioned her mode of life. He received a five years' sentence in the penitentiary, and soon after arrival there was noted as being excitable and irritable. He had several attacks described as maniacal, and during these he frequently attacked the attendant. He was transferred to this hospital April 7, 1911. On admission he was nervous and apprehensive, easily became excited, and there was clouding of consciousness. When an attempt was made to examine him the following day, he became intensely excited, profane and threatening. This excitement somewhat subsided and he was allowed the privilege of walking in the yard. He comported himself well, except when spoken to by the physician, when he would become quite excited. He made a plot to escape which was detected. In consequence of this, his privileges were removed, and this was followed by another excited attack. He was finally discharged as recovered from prison psychosis, August 10, 1911. A similar case is No. 19438.

CASE No. 19243 shows an infection-exhaustion psychosis followed several years later by an arteriosclerotic excitement. Patient is a colored female, and was first admitted to the hospital in 1908, being at that time fifty-four years old. She was diagnosed as an infection-exhaustion psychosis and discharged as recovered three months later. She was readmitted June 19, 1911. Mental examination at that time showed her to be extremely excited, yelling, singing, praying and running about, overturning the furniture. There was complete clouding of consciousness, memory was fair and the special tests were well performed. She believed that she could converse with spirits, and had the gift of prophecy. She thought the world was coming to an end and that she had been sent to warn the people. The physical examination showed sclerosis of the arteries and high blood pressure. She continued excited for several months, then quieted down. The

field of consciousness became clear and no hallucinations or delusions could be elicited. A diagnosis of excitement associated with arteriosclerosis was made, and she was discharged recovered. At the time of her first admission, she was suffering from septicemia due to a large abcess on the leg and lymphangitis. A somewhat similar case is No. 19623.

Case No. 18556 shows a white male who was admitted to the hospital on February, 1907, suffering from alcoholic psychosis from which he recovered and was discharged in November, of the same year. May 30, 1910, he was readmitted and found to be suffering from senile dementia. He remained in the hospital until his death, March 6, 1911. Case No. 16300 shows a white female, seventy-eight years old who was admitted first in January, 1906, suffering from senile dementia, and was discharged to the care of her daughter in August of the same year. Five months later, she was readmitted suffering from an acute confusional state which was found to be due to kidney and heart disease, and cleared up under appropriate treatment, leaving the senile dementia as before. Case No. 21348 shows a psychopathic character, a colored female who has been admitted to the hospital on six occasions, suffering from alcoholic psychoses. Case No. 20872 shows a white male who was admitted to the hospital in 1898 and discharged a few months later. Readmitted in January, 1899, and discharged December, 1905. Readmitted June, 1907, and discharged November, 1907. Readmitted December, 1907, discharged January, 1910. Readmitted April, 1910, and discharged October, 1911. Readmitted February, 1913, discharged May, of the same year. On each of these admissions, he was suffering from alcoholic psychosis. He was readmitted the last time in August, 1913, suffering from excitement associated with arteriosclerosis.

Case No. 14933 is a colored male, aged nineteen on his first admission in March, 1902. He had previously been an inmate of the district jail, being sent there for attempting to kill a man with a knife. While at the jail, he became violent, fighting the guards and beating his head against the wall. About two weeks after admission to this hospital he became quite excited while at dinner one day, jumped on one of the attendants and began to fight. He became involved in several other fights with the attendants during his residence here, but finally became free from excitement and was discharged in December, 1902, as recovered from prison psychosis. On September 22, 1904, he was readmitted and found to be disoriented in all spheres. He could give little account of the events leading up to his second admission. Up to February, 1907, he is described as being stubborn, resistive, excitable and had to be restrained on many occasions. February 2, 1907, he had a general convulsion accompanied by loss of consciousness and vomiting. Since that time, convulsions were frequent. He was unable to get about and was almost constantly noisy, shouting, yelling and

screaming. He was filthy in his habits and totally oblivious to his surroundings. He died June 14, 1911. Autopsy showed the presence of cerebral syphilis.

CASE No. 17465 is that of a white male who had a paranoid state when fifty-five years old, lasting about one year, and terminating in recovery followed five years later by general paresis which ended in death fifteen months later. At the time of his paranoid state, he was an inmate of the Soldiers' Home, and suffered from delusions of persecution and auditory hallucinations; at times he was so violent and assaulted the other members of the home on such slight provocation, that it was necessary to seclude him. An autopsy was performed at this hospital which confirmed the diagnosis of general paresis.

CASE No. 14618 is that of a colored male who was first admitted to the hospital in 1900. His age at that time was uncertain, being probably somewhere between twenty-five and thirty-five. He was found to be an imbecile and was discharged to the care of his family two months later. Two years later, he was admitted again and remained in the hospital seven months. Two years following this, he was readmitted suffering from excitement with delusions of a grandiose and persecutory tendency. He died in February, 1913. The post-mortem examination showed arteriosclerosis of the brain.

CASE No. 20661 shows a white male aged twenty-six on his first admission, January, 1909, when he was suffering from an infection-exhaustion psychosis following malaria. He was discharged as recovered in December of the same year. He was readmitted two years later with the same diagnosis, and was discharged as recovered at the end of seven months. He entered the Soldiers' Home in March, 1913, and was admitted here in May of the same year, with a history that he had various delusions, was noisy, required to be restrained and was destructive. Physical examination made here was negative. Mental examination showed him to be accurately oriented. No hallucinations could be obtained. He suffered from paranoid ideas directed toward the officers of the Soldiers' Home, who he thought discriminated against him. He soon recovered from these ideas, was given parole of the grounds and finally discharged November 3, 1913, as recovered from paranoid state. This is indubitably an individual of unstable organization who had two attacks of infection-exhaustion psychosis, and later on paranoid state.

The only case of paranoia complicated by any other psychosis which I have been able to find does not lend itself very readily to abstraction. The patient was first admitted to this hospital on April 6, 1910, Case No. 18451. He was then sixty-seven years old. At that time, his case attracted considerable newspaper attention. He was well known throughout Virginia, District of Columbia and Maryland by the legal profession. It seems

he began many years ago, to file suit against residents of these states, some of the defendants being his most intimate friends and neighbors.   The courts all over these states were appealed to by this patient for redress for his fancied grievances.   He succeeded in obtaining a number of judgments, and frequently attempted to execute these, the exact number of suits which he has filed is not known, but they are estimated as several thousand.   His claim against one express company alone amounted to more than one million dollars.   He was referred by the newspapers as the " King of Litigants," and the " Eternal Litigant."   Lawyers refer to his case as " The Romance of the Law," and some of his cases are quoted in legal text-books in the states in which he operated. His case is undoubtedly litigious paranoia.   Since being an inmate of this hospital, he has shown considerable deterioration, so that his case might be taken for one of senile dementia by any one not familiar with his history.   He is quite childish in his appearance in conversation and his productions now are quite puerile.   It is evident that in his present state, he would not be able to carry on his former activities.   His defective judgment is shown by his transparent ruses to gain his release ; for instance, when one of the physicians is away for a few days, he will hand his substitute a document which he says was written by the other physician. This is something to the effect that he is sane.   He always states that the other doctor gave it to him before he left, in spite of the fact that is in the patient's own handwriting.   He writes some- times to his relatives requesting that they bring him a revolver and some ammunition so that he might shoot the physician and gain his release.   He writes a letter one week alluding to a certain lawyer in town as a " shyster " and a " crook," and a week later writes him to come out and handle his case.

A careful search of the records failed to reveal any cases of manic-depressive psychosis and dementia præcox occurring in the same individual, but there were five well marked cases of the manic-depressive reaction in a præcox case.   One of these will suffice for illustration.   Case No. 16984, male, white, age twenty- six on admission, single, letter-carrier, resident of the district. Father and brother were at one time insane.   Early history un- known.   Patient had been erratic in conduct for some time before his first admission here.   July 1, 1905, he packed his trunk, left the city without notice, visited his relatives at Port Deposit, Md., acted strangely, and had to be brought back.   He showed psycho- motor activity, marked flight of ideas and emotional excitement. On his first admission on July 19, 1905, he was quiet and orderly. Improvement led to his being given parole on August 9, 1905, but three days later, he eloped and on his return after three days, he was erratic, talkative, noisy, fault-finding, disorderly.   He was discharged by court, August 18, 1905.   The patient then worked as a letter-carrier, and baggage agent.   On several occasions when

seen by physician, there was mild flight of ideas, lack of insight, and evidence of excessive alcoholic indulgence. He sent irrational postcards to hospital employees. Medical certificate from Washington Asylum Hospital shows that since discharge by court, patient had been addicted to alcoholic excesses, and for three months prior to the last (second) admission, he showed pressure of activity, flight of ideas and emotional exaltation, with a tendency to probable impulsive attacks, and fits of violent temper, in which he was destructive, noisy, and profane. There were mild transient delusions of persecution, he imagined his food was being poisoned, and the police were after him. On readmission, January 17, 1908, there was psychomotor activity and flight of ideas, with some apparent looseness in the train of thought, and neologism. Stenogram four days after readmission shows a lessening of both psychomotor activity and emotional exaltation, with flight of ideas and distractibility. August 30, 1908, patient presented a dull expression, slowness of comprehension and ideation; disorientation for time and person, and partially for place; well marked indifference, disagreeable auditory hallucinations, lack of insight. On November 16, 1908, there was apparent mutism and negativism, even to refusal of food, so that tube-feeding had to be resorted to. Two days later, patient became a little more communicative and complained that the milk and eggs made him sick. On examination by the physician he was put to bed, a double lobar pneumonia developed, and on November 28, 1908, he died from cardiac failure. There was no autopsy.

The other cases which show this same combination were Nos. 17484, 18325, 19630 and 16776.

The above cases are not sufficient material upon which to base any generalization. A few points only appear somewhat remarkable and may perhaps be noted as affording basis for future investigation. It seems rather strange, for instance, that there were more psychoses associated with dementia præcox than with manic-depressive psychosis. Also it might have been expected that more than two cases would have been found of syphilitic psychosis engrafted upon another variety. The total number of combined psychoses found—forty-one—is rather small, when we consider the large number of readmissions to the hospital, but this is largely due to the inadequate notes made on cases up until comparatively recent years. Probably the future will uncover a larger proportion of combined psychoses owing to the fact that it is the present custom and has been for the past eight or ten years to obtain elaborate anamneses and to make copious notes at regular intervals.

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Society Proceedings

NEW YORK NEUROLOGICAL SOCIETY

The Vice-President, Dr. E. G. Zabriskie in the Chair

BRAIN WITH DOUBLE FRONTAL ABSCESSES

By L. Casamajor, M.D.

The history was given by Dr. E. J. Smith, of Larchmont, N. Y. The patient was a mechanic and inventor, 50 years old, whose family history was negative. Between the ages of 20 and 30 he had suffered from several severe attacks of articular rheumatism, with heart complications. The patient had always been very active as a young man, and at one time was a long-distance bicycle rider. Until about twenty years ago he used alchohol habitually and to excess, but for fifteen years preceding his death he had been a total abstainer. He smoked constantly and used chewing tobacco daily. During the past ten years he had worked very hard at his trade and had accomplished a great deal in a mechanical line. He took no recreation excepting a few days each summer, when he did some yacht racing.

The exact date of the onset of his present illness could not be fixed. He was in the habit of receiving osteopathic treatment for minor ailments, and was under the care of an osteopath when he came under Dr. Smith's observation on March 10, 1914. At that time the patient complained only of a slight frontal headache and of being unusually tired. He had the appearance of being slightly jaundiced. The pupils were contracted, reacting slowly. The tongue was heavily coated and the breath offensive. The temperature was normal: pulse, 60 per minute and full. On his first day in the hospital he refused to stay in bed: he wished to go to business and insisted on smoking his pipe. On the following day he kept his bed and abstained from tobacco. He remained in his usual jovial mood and his symptoms were such as one would expect in a case of catarrhal jaundice. His condition remained practically unchanged for four days, without improvement in appetite, appearance of tongue, etc., in spite of active purgation.

On the fifth day it was observed that he was quite indifferent to his surroundings and very talkative. His headache had disappeared almost entirely and he still had nothing to complain of. When left alone he talked and whistled, and was not at all disturbed when he soiled the bed by an involuntary defecation. His pulse remained slow, and his rectal temperature on the fifth day was 101°. The urine was stained deeply with bile; it contained a trace of albumin; no sugar; there was a marked indican reaction and a few hyaline casts. No complete blood count was made, but a differential count showed 79 per cent. polynuclears. The stools were of-

fensive and lighter in color than normal   The pupils remained contracted
and sluggish, acting equally.   The ears showed nothing abnormal and there
was no nasal discharge.

The patient remained in practically the same condition for another
twenty-four hours, appearing indifferent when he was alone, but acting
quite rationally upon being questioned.   There was no paralysis and the
reflexes were normal, excepting the pupillary.   His temperature, on the
evening of the sixth day, was 101° in the rectum; pulse, 54; respirations, 18.
At 8 A.M. on the seventh day after his admission he suddenly developed
a chill, his rectal temperature rose to 106°, he became comatose, developed
Cheyne-Stokes respiration and died in three hours.

Two days prior to this patient's death his family was advised that the
symptoms pointed to some unusual brain lesion, the exact nature of which
was not clear.

Autopsy: The brain was removed, and upon its removal about ½ ounce
of foul-smelling pus escaped through the right frontal lobe.   Further ex-
ploration showed a double frontal abscess, undoubtedly primary on the right
side and extending through the corpus callosum into the left frontal lobe.
No other abnormality was found.   There was no pus in the ventricles; no
internal hydrocephalus.

The pus found in these abscesses contained the Bacillus pyocyaneus.
The infection from this organism, Dr. Casamajor said, was, according to
Oppenheim, most often hematogenous and was one of the commonest
causes of brain abscess.   The meninges in this case, as well as the frontal
and other sinuses, showed no evidence of involvement.

PAVOR NOCTURNUS. TWO CASES. THERAPEUTIC
CONSIDERATIONS

By A. Stern, M.D.

The first case was a girl, eight years old, the youngest of seven chil-
dren.   The mother of the child was markedly neurotic; otherwise the
family history was negative.   This child had always been her mother's
pet, rarely leaving her side and without any desire to play with other
children.   She cried bitterly when her mother went anywhere without her.
She had always been fed, dressed and bathed by the mother, who had
noticed that while bathing the child, when the mother's hand came in con-
tact with its genitals, the child would press the hand between its thighs.
This, Dr. Stern said, we might consider a sexual trauma, as surely we could
interpret the child's action in no other light than a desire to prolong the
contact, and in this way a desire of a distinctly sexual nature was directed
by the child toward the mother.   Naturally, the child desired to be when-
ever it could in the presence of her mother—its loved object, and this was
easily enough accomplished by day, while night terrors, from which the
child frequently suffered, served the purpose at night.

Night terrors were very properly so called, the speaker said, not only
because the children, during the attacks, have such an expression of dread
and anxiety on their countenance, but also because these attacks produced
terror in the members of the family, and it was through the latter that the
child gained its object, namely, to have some one with it at night.

In this case, as in the second case reported, the child was cured of
its night terrors by instructing the mother to insist upon its sleeping

alone and paying no attention to it when the attacks occurred. The children were also taught to rely on themselves, to become less self-indulgent and to spend more time in the company of other children.

Dr. Stern said that the practical application of the knowledge gained from Freud's teachings perhaps nowhere else showed such rapid and brilliant results as in the treatment of the different manifestations of the neuroses as they occured in children. Stekel held the view that the most common form of neurosis that existed in children was the anxiety neurosis, and a very frequent manifestation of this neurosis, and one heretofore very difficult to treat, was the night terror.

The causes of pavor nocturnus, as heretofore given, were about as follows: 1. Adenoids and enlarged tonsils. 2. Large and irregular or indigestible meals eaten before going to bed. 3. Terrifying stories told to children before retiring.

In answer to a question as to how the treatment in these two cases differed from that employed heretofore, Dr. Stern said that Holt, in his book, recommended that in cases of night terror where children were very much frightened, some one should be in the room with them, which was directly opposed to the treatment employed in these cases. Drugs had also been recommended, among them bromides.

A CASE OF VAGOTONIA

By Walter Timme, M.D.

Dr. Walter Timme gave a brief survey of the autonomic nervous system, in which he mentioned some of the characteristics of an over-active extended vagus, which were manifested in his patient, such as hyperacidity, hypermotility of the stomach, vomiting, constipation with occasional diarrhea, bradycardia, low blood pressure (105-110 mm.), dermatographism, absent gag reflex, clammy hands and feet and cessation of menstruation. In striking contrast to these symptoms were those of a marked sympathicotonia, namely, mydriasis and wide palpebral fissures.

The patient was an unmarried woman, 29 years old, who was engaged at social service work. Of some importance in her family history was the fact that two members of her mother's family had suffered from attacks of spasmodic asthma for twenty years. This patient, following a seccession of mental shocks in the spring of 1911, began to vomit after each meal, and this daily vomiting had persisted without any lapse up to the present time, a period of over three years. Eight years ago she had a similar attack which lasted three weeks and ceased spontaneously.

The excessive motility of her stomach musculature was proven by two roentgenograms, showing that the stomach emptied itself of bismuth paste in twenty minutes. One of these plates showed very well the condition of the spastic stomach wall termed by Holzknecht "cowhorn" stomach. It was found that the patient could retain some articles of food, notably chocolate, for a much longer period; perhaps this was due to the slightly sympathetic stimulant theobromine which chocolate contained. As the patient was not willing to give up her work, the treatment with atropine could not be carried out very satisfactorily; so much so, in fact, that the small doses of the drug that had been given seemed to bring out a greater opposition on the part of the vagus, increasing some of her symptoms. Various combinations of glandular extracts had been tried with very little

effect. The patient had also been under psychoanalytic treatment without any success.

In reply to a question, Dr. Timme said the patient could retain coffee, if it was strong. As to whether an intra-thoracic thyroid could be ruled out in this case, the speaker said it could not. Vagotonia might be a disease entity, or it might accompany any of the toxic conditions.

Dr. S. Rothenberg, of Brooklyn, said that in the article by Eppinger and Hess on this subject, the authors suggest that it was sometimes possible to bring out an entire train of symptoms by the injection of a small dose of pilocarpin, and the aggravation of certain symptoms thus elicited might act as a guide in the subsequent therapy of the case.

Dr. D. M. Kaplan referred to the work of Fleischmann in the Hess clinic, who came to the conclusion that it was absolutely impossible to classify these cases, owing to the fact that one group of symptoms corresponded to the vagotonic condition while another corresponded to the sympathetic. For example, the dilated pupil had been explained by Eppinger and Hess as due to the presence of excessive adrenal secretion in the blood, and he advised certain tests for ascertaining the amount of the adrenal secretion.

Dr. Timme said the pilocarpin test mentioned by Dr. Rothenberg was only useful in cases where the irritability of the vagus was in doubt. When the vagotonic symptoms were present, the pilocarpin test was unnecessary. As a matter of fact, pilocarpin had been tried in this case and had aggravated the vagotonic symptoms. The speaker said he had seen no instance in which all the symptoms were either wholly vagotonic or sympathetic, and he knew of no one else who had reported a pure case of vagotonia.

Dr. I. Abrahamson thought the word vagotonia was a misnomer in these cases, as the vagus was a very complex bundle of nerves made up of mixed fibers, including both accelerator and depressor fibers to all the viscera. It would be preferable, he thought, to speak of these symptoms as being derangements of either the autonomic or sympathetic systems and to drop the word vagotonia altogether.

PAIN AND TENDERNESS IN SPINAL DISEASE AND ITS SURGICAL TREATMENT

By Charles A. Elsberg, M.D.

Dr. Elsberg showed cases and lantern slides to illustrate the peculiarities in sensory disturbances observed on patients in the course of 100 spinal operations. He emphasized the fact that there was a marked difference between the cervical and the dorsal spinal roots in their structure as well as their course: the cervical roots originated from the cord over an area one to two centimeters wide and ran as separate bundles to the dura, while in the dorsal region the bundles soon united to form one nerve root. Therefore, in the cervical region, a tumor could press on a few of the root bundles and give rise to symptoms from those bundles only, so that one should differentiate between root bundle symptoms and root symptoms. He reported several cases in which pressure upon the lower root bundles of the seventh cervical posterior root produced pain limited to the index finger, so that it was probable that the lower root bundles of the seventh cervical nerve supplied the index finger and perhaps part of the middle finger.

Dr. Elsberg then described the peculiar course of the nerve roots. In the dorsal region the roots first ran downwards, bending upwards again at a very acute angle. Further investigation had shown that the inner surface of the dura of the spinal cord was very sensitive, while the cord itself was insensitive excepting near the origin of the posterior roots, and the posterior roots themselves were very sensitive. Taking these facts into account, it was easy to understand how a small focus of malignant disease in the posterior and lateral surface of the body of a vertebra could cause very acute root pains. Extra-medullary tumors which did not press upon nerve roots might cause pain in the back from pressure on the inner surface of the dura, especially if they laid in front of the slip of the dentate ligament.

The reader then described a peculiar set of symptoms which he had observed in several cases of extra-dural tumor. There was a kind of reverse Brown-Séquard, the motor symptoms being on the opposite side and the sensory symptoms on the same side as the tumor. In these cases there was a collection of fluid under the dura on the side of the tumor, which pressed the spinal cord to the opposite side against the walls of the spinal canal, so that the motor symptoms were due to the pressure of the contra-lateral pyramidal tract against the bony wall of the canal. This could be called *contre coup,* and was similar to what occurred in the posterior cranial fossa when a cerebellar tumor of one side pushed the cerebellum to the other side and caused the facial nerve of the contra-lateral side to be pressed against the petrous portion of the temporal bone, with resulting facial paralysis on the side opposite to the lesion. Finally, he reported peculiar anomalies of the spinal vessels which gave rise to irregular symptoms and which had not hitherto been described. These cases, he said, deserved further study.

In order to illustrate the facts of the paper, Dr. Elsberg presented the following cases:

1. A patient who was completely relieved of symptoms of abdominal pain on the right side by the removal of an extra-medullary spinal tumor from the 12th dorsal segment.

2. A patient from whom a tumor had been removed at the 8th dorsal segment, underneath the slip of the dentate ligament. This tumor had caused paraplegia and severe pain in the back.

3. A patient cured after removal of a tumor from the 8th cervical segment. She had suffered from marked motor symptoms for a long time but sensory symptoms only appeared after lumbar puncture had been done.

4. A patient who rapidly recovered from a paraplegia of three years' duration after the removal of a small tumor from the 6th cervical segment. This patient at first presented symptoms at the 11th dorsal, but a laminectomy failed to discover the tumor. A year later, the patient presented level symptoms at the 1st to 2d dorsal, but the tumor was found at the 6th cervical.

5. A patient who had had spastic paraplegia due to a localized pachymeningitis, with tremendous thickening of the dura at the 6th dorsal level who was completely relieved by excision of the thickened dura.

6. A patient completely relieved for a number of years by decompressive laminectomy from symptoms simulating multiple sclerosis.

7. A patient with acromegaly who had had an acute exudate in the sella turcica, causing the rapid development of eye symptoms. When the patient was admitted to the hospital he had meningeal signs, was blind in

the left eye and had temporal hemianopsia in the right eye. With the subsidence of the hypophysitis or perihypophysitis, the fields of vision in both eyes gradually returned to normal.

Dr. I. Strauss, discussing the last case shown by Dr. Elsberg, said that when he saw this patient, together with Dr. Sachs, the man was in a condition of stupor. He had previously been examined by Dr. Abrahamson, who was then able to make out a hemianopsia in one eye, but when Dr. Strauss saw him the patient was not sufficiently conscious to answer questions. He had then been in the service of Dr. Morris Manges for about a week with a temperature curve very suggestive of typhoid fever, and an examination of the blood showed the presence of the paratyphoid bacillus. He had been suffering for some time from a profuse and offensive nasal discharge. There was increasing stupor and coma, with a slight Kernig's sign and some stiffness of the neck. Repeated lumbar puncture gave clear fluid and no increased leucocytosis: hence it seemed certain that there was no meningeal process. There was a history of trauma eleven years previously (falling from a considerable height) followed shortly afterwards by enlargement of the hands and changes in the face characteristic of acromegaly. The acromegalic features of the case were regarded as due possibly to a traumatic cyst or some other disturbances of the hypophysis. The acute symptoms were regarded as being due to ethmoidal or sphenoidal disease, possibly of paratyphoid origin, though this was not proven. Dr. Emil Mayer was then asked to see the case, and he felt somewhat loath about exposing the sinuses on account of the general blood infections but he was finally convinced that there was no reason why a local focus of infection of this kind, provided it existed, should not be treated just as is done in bacteriemia due to sinus thrombosis in otitic disease. He thereupon opened the ethmoidal cells and drained them. From that time on the patient's improvement set in, and on the very next day his mental condition was much better. It was possible to rouse him, he answered questions intelligently and his temperature gradually reached normal by lysis. At the same time the remarkable improvement in his sight which Dr. Elsberg has shown by his charts, developed.

This case, Dr. Strauss said, seemed to him to present an infection of the sinuses with secondary involvement of the chiasm. The rhinologist not infrequently saw cases of sinus disease, ethmoidal or sphenoidal, with optic neuritis which may go on to blindness, if unrelieved, and the emptying of the sinuses was always followed by a rapid return of vision and lessening of the inflammation of the optic nerve. The speaker said he did not see how the symptoms in this case and their rapid disappearance after operation could be interpreted in any other way. One can be almost certain that there was no meningeal involvement, as proven by the fact that the spinal fluid was clear and that recovery was so speedy.

Dr. L. Hauswirth (by invitation,) who had seen the case in the service of Dr. Morris Manges at Mt. Sinai Hospital, said the sequence of symptoms in this case was rather remarkable, and they finally led to the conclusion that they had to deal with a sinus infection in a patient with acromegaly. The man gave the history of having fallen from a 4-story building 10 years ago and that he grew tremendously after that. When he was admitted to the hospital he stated that for the preceding ten days he had noticed that the sight of his left eye was becoming dimmer and was gradually lost. He then became unconscious, although when Dr. Abrahamson saw him after withdrawing 30 c.c. of spinal fluid he was able to demonstrate a

temporal hemianopsia on the right side and complete blindness on the left. The question naturally arose whether the fall might not have resulted in a hemorrhage, with the formation of a cyst. A peculiar odor was noticed about his bed, and a very offensive discharge was found from both nostrils, particularly from the right. Dr. Emil Mayer's operation on the ethmoidal cells was followed by an immediate improvement in the sight of the left eye; and within twenty-four hours he had a bitemporal hemianopsia which soon disappeared. The failure of the hemianopsia to persist proved either that he had had no cyst at all, or that it had disappeared, an unlikely alternative.

That the infection of the sinus in this case was of paratyphoidal origin, Dr. Hauswirth said, had not yet been proven.

Dr. J. Ramsay Hunt said it was certainly a great pleasure to listen to a surgeon who had had the opportunity of seeing these lesions in the living subject, and who was able at the same time to discuss them from the viewpoint of the neurologist.

Among the lesions described by Dr. Elsberg was an enlargement and varicosity of the veins of the pia-mater, which corresponded in level to the distribution of the symptomatology. In such a condition, the natural presumption would be a secondary congestion of the venous circulation from pathological changes within the spinal cord itself. In this connection it is of interest to recall the rare occurrence of varicose veins of the sciatic nerve.

Speaking of the vertebra pain associated with spinal tumors. Dr. Hunt said he had always explained this on the basis of a localized meningeal irritation. This pain, in his experience, was usually bilateral, and had not the unilateral distribution of the root pains. He thought it well that Dr. Elsberg had emphasized the importance of cutting the posterior root where it had been subjected to pressure for a considerable length of time, and in that connection he asked his advice as to the advisability of cutting these roots for the relief of a long-standing unilateral spasticity, when the site of operation exposed the necessary root distribution. The possibility of contralateral pressure symptoms occurring in connection with lesions of the cord, as shown by the reader of the paper, was of extreme interest. The mechanism of contralateral pressure was recognized as a rare occurrence in the hemisphere of the brain and also in the brain stem, in which event its recognition would be of great importance from the operative standpoint.

Dr. I. Abrahamson said he had seen two cases where marked changes of the vessels of the cord were present. The specimens had not yet been carefully examined in order to determine whether they formed the beginning of an angiomatous condition or a true varix. One specimen did not show any dilatation of the vein—only a moderate hyaline degeneration of its walls. These cases were quite typical in their symptoms, and were in sharp contrast to those common to extramedullary tumor of the cord. In the latter, the motor symptoms were markedly predominant, with root symptoms at the level, while the cases with varicose vessels showed a marked preponderance of the sensory symptoms, the motor symptoms never equalling the sensory in their intensity. The finding of this dilated blood vessel at the exact level and position that was indicated by the signs and symptoms left but very little doubt as to its etiological importance. When one had to deal with a rather atypical level cord picture suggesting an intra-medullary lesion and yet not characteristically so, associated with

slight motor symptoms and marked sensory symptoms, one should be on the lookout for this condition of varix or a type of angioma of the cord.

Dr. Foster Kennedy said that *apropos* of angioma of the cord producing symptoms referable to the interior of the cord rather than to pressure upon the outside of the cord—that is, intra- rather than extra-medullary—he thought it well to bear in mind that a chronic syphilitic pachymeningitis of long duration very frequently produced such circulatory conditions, usually by nipping of the blood vessels, as to cause a breaking down of the interior of the cord, so that we had to deal with a syphilitic syringomyelia. He asked Dr. Elsberg whether he regarded these symptoms as being due to the direct pressure of the varix or to the circulatory disturbance produced thereby; in other words, whether the symptoms were mechanical or circulatory?

Dr. H. Climenko said he had had the opportunity to observe two of these cases in the service of Dr. Abrahamson. In one of them the sypmtoms closely simulated multiple sclerosis: the sensory symptoms made their appearance later. In the second case he saw the symptoms were also very puzzling for a long time and as it subsequently was shown, the sensory symptoms did not correspond to the location of the tumor. Moreover, there was no constant level, the symptoms shifting up and down. The motor symptoms in this case were so far advanced that even if a tumor had been found, no such improvement as actually occurred would have been expected.

Dr. S. P. Goodhart said that in one of the cases which he saw, the patient gave an early history of paresthesia affecting the thumb and index finger of one hand. It had since occurred to him, the speaker said, that it was very likely that some of the fasciculi of the cord were affected at that time.

Dr. Alfred S. Taylor said that one must be careful lest we attribute too much importance to the presence of these varices. There was a considerable space between the cord and the dura, and he could recall several cases where he had observed large veins in this location, and where a simple decompression had given perfectly satisfactory relief, the condition probably being one of inflammation in the cord and the enlarged vessels being an expression of such inflammation.

Dr. Elsberg, in closing, replying to Dr. Hunt's question as to the advisability of cutting the posterior nerve roots for the relief of spasticity, said he would only advise such a step in cases where the cord had been subjected to pressure for a long time, perhaps four, five or six years, and had been injured beyond the hope of recovery.

As to the significance of these enlarged vessels, he felt convinced they were not the ordinary congested vessels one found accompanying an inflammatory process. In the condition he had described, the veins were from six to eight times their normal size—larger than the radial artery, and at once impressed the operator as enormous vessels of abnormal size. In 114 spinal operations, he had only observed this peculiar enlargement six times; ordinary slight inflammatory enlargement he had seen many times. His object in showing these cases was to call attention to this peculiar anatomical condition that so far as he knew had not been described elsewhere.

SOME PSYCHOLOGIC STUDIES ON THE NATURE AND PATHOGENESIS OF EPILEPSY

By L. Pierce Clark, M.D.

Dr. Clark referred to the views whether genuine epilepsy was a degenerative organic disease of the cerebral cortex, or a neurosis in its true sense, a functional disease of the nervous system without demonstrable or constant lesions. Both of these views had their strong points and possessed their special advocates. Suffice it to say that probably even less than one half of all cases of genuine epilepsy had a generally acknowledged gross or microscopic pathology or constant lesion. On the other hand, the chemotoxic theory of the disease had even less positive evidence to offer. Even the experimental use of these toxic agents did not produce constant convulsive symptoms. Epilepsy, as we knew it clinically, could not be experimentally induced. There was always something lacking.

In view of the present unsatisfactory anatomic pathology of the disease and an equal failure in chemotoxic pathogenesis, it behooved us to study the clinical makeup of epilepsy more closely. With this view in mind, Dr. Clark said he undertook two years ago to analyze the epileptic temperament and character before the convulsions had occurred. Obviously, cases for such a study had to be selected from those individuals who were already epileptic but in whom it was possible to study the developmental traits of character before the convulsive part of the disorder had developed to complicate the personality makeup. Some 25 cases had now been analyzed carefully by his method. First of all, cases of feeblemindedness were absolutely excluded, and the majority of those selected were often above their grades at school. The following was a summary of his findings:

It was found that the potential epileptic, as a rule, possessed a supernormal output of energy which was constant and fairly productive of good development results as far as the organic makeup was concerned. There was a poorly repressed or thinly inhibited outcropping of the egotistic tendencies. These characteristics of a pathologic self-love were far beyond the bounds of a pure physiologic variation. As a rule, the potential epileptic was illy adapted to his environment and could not easily change the same. He coöperated badly in social and economic settings. For the most part he was frank; the subtleties of mind were not his; on the contrary, he had a simple childlike pattern of emotional life. He never had the scruples nor doubts of the obsessive neurotic; not being hindered with the inhibitions and prohibitions of the latter class, he was often permitted to become engrossed with the lower animal instincts and passions. With the inhibitions reduced and with an over-emphasized estimate of his own importance and ability, the potential epileptic found himself in constant conflict with the outside world. While the normal individual had his infantile struggle with reality and made the life compromise, the potential epileptic youth kept up the baffling struggle; hence his deep-rooted dislike and even hate of the outside world. Individuals who possessed the epileptic constitution lacked real general interests. The libido was rigid, self-centered and crude. There were small religious promptings; the meaning and ends of life rarely engrossed the potential epileptic. His friendships were perfunctory: the egotistic traits prevented a free range of emotional expression.

A parental attachment of the potential epileptic to his own sex was the

rule and this was especially marked in girls. The love fixation to the mother in the majority was prominent more or less throughout life. The potential epileptic's attitude towards the opposite sex was very significant: it rarely possessed the higher love attributes and more frequently evolved little beyond the simplest or grossest sexual demands. That fact alone, independent of the superadded convulsive disorder, made marriage among epileptics almost invariably a failure.

For some time now it had been customary for psychiatrists to ask themselves, what do psychotic individuals get out of their disease? What purpose do the mental symptoms and settings serve to the unconscious and instinctive demands of the person so afflicted? Such studies had compelled the investigators to discard much of the conscious formulation of the obvious content of the psychosis, and look more deeply into the unconscious strivings as shown in the symbolic utterance and behavior of their patients. With this altered approach to mental disorders a new era dawned in psychiatry; mental symptoms once discarded as meaningless or unimportant took on a new significance and interpretation. From the inspiration of such work, Dr. Clark said, he undertook to study anew the meaning of the fit in epilepsy, a work now some two years old. He now had the material of a dozen or more cases of genuine epilepsy, an epitome of the findings of which he briefly set forth. Uniformly in all cases it was found that the fit served as an unconscious gratification to the libido. By dream analysis, the analysis of many minor attacks and a few major fits, this unconscious striving was often a frank sexual outlet; in others it was a discharge of accumulated pleasure affects that had been long accumulating in the individual epileptic.

The essential motive in all genuine epileptic fits would seem to be at bottom an unconscious striving on the part of the epileptic to return to the intrauterine life in the mother in a state of perfect peace and allmacht. with its insistent urge in the fits, and is conditioned upon the stage of libido fixation in infancy, which occasionally may be so advanced as to reach into homosexuality but rarely into heterosexual life.

Finally, we have more or less definitely indicated what the motive of the unconscious mechanism of the fit really is, but how may we account for the nature and character of the classic but peculiar type of muscular spasm in the grand mal seizure? At another time, Dr. Clark said, he hoped to give a detailed comparative study to show that the types of muscular movements were from that infantile period to which the unconscious urge strives to force the unconsciousness to return, namely, the intra-uterine period and possibly the first few months of extra-uterine existence. The seizure movements were point for point identical with the impulsive movements of the fetus and the period of earliest infancy. In the normally developing child. these muscular movements were slowly but definitely repressed as the will and the conscious life unfolded: in the epileptic the impulsive movement of earliest infancy were released from conscious and voluntary control. and they re-enacted the fetal and infantile purposes of satisfaction of that period.

Lastly, the speaker referred to the enormous therapeutic gain we might obtain in looking at the epileptic mechanism in the light of the therapy briefly set forth in his paper. The hygienic training treatment, the educational and environmental therapy were given a new and clearer meaning by this hypothesis: it signally made clear the reasons for the large majority of epileptics who could not be cured, and, at the same time, it

showed a much more definite and speedier plan by which we might rescue the less severe cases of epilepsy by restoring them to health as shown in an arrest or cure of epileptic fits.

Dr. August Hoch was much interested in Dr. Clark's paper, which was a very valuable contribution, not only to the study of epilepsy, but to the subject of analysis of abnormal mental states in general. On account of the lateness of the hour he desired in his discussion, to confine himself to a few remarks on the general principle of such studies, which, when reported briefly as Dr. Clark did, and outside of the setting of other kindred studies of neuroses and psychoses, often fail to be understood, or, at any rate, do not carry conviction. The most prominent feature which Dr. Clark's study brought out, is that in epilepsy, as is the case in the psychoses and neuroses, that which we might call infantile motives play an important rôle. Such infantile motives are the result of imperfect development of the instincts. Such motives Freud had demonstrated in the neuroses by means of his psychoanalytic method. In psychoses they are very prominent, and, what is more important, quite plain. They express themselves often in delusions and hallucinations of the patient, which we did not understand formerly because the patient does not produce them in an adult logical form, and because we had no idea of the fact that a effective instinct development can give rise to such motives. But once this is known, many of the utterances of the insane become strikingly clear, and do not require the complicated, difficult, and, in the hands of the inexperienced, doubtful method of interpretation, because the patients very plainly express these infantile desires. The interesting personality studies on epileptics which Dr. Clark made, also gave us as all such studies do, an interesting confirmation of the claim that the epileptic presents imperfectly developed instincts. But now we must agree that it is difficult to admit the claim that in patients with constitutional disorder there is an all engrossing attachment to the parents into which even sexual elements enter; but the matter becomes very convincing when we find that this motive returns, with almost tiresome frequency, in the delusions and hallucinations of the psychoses. Still more absurd seems, at first glance the desire to get back into the mother's body, but when looked at from the point of view of a desire for complete shelter, for that most fundamental renunciation of adaptation to reality, it appears much more reasonable, and the special formulation which we find in delusions and in dreams, namely, a formulation which often refers to the real womb, is likely to be, in large part, a secondary mental elaboration. At any rate, this motive has to be accepted as a definite fact, no matter how we try to explain it.

This entire method of studying diseases has added much to our knowledge of the symptom analysis, the structure of the clinical factors, and the forces at work. It should, of course, not be claimed that the forces thus discovered, and the imperfect instinct development, is the final cause of epilepsy. Such studies give no account, and do not claim to give any account, of the organic causes of the constitutional defect, or the organic side of abnormal functioning of the instincts.

Dr. John T. MacCurdy said he had been interested in the problem of epilepsy for some years, and thought that all those who had studied epilepsy with psychoanalytic methods would admit that Dr. Clark's paper marked the most important advance in our knowledge of the subject. We knew from our data, pathologic, clinical and hereditary, that epilepsy occupied a lower scale in mental adaption than did dementia præcox. In

the latter, the essential feature was the attachment of the patient to
the parent of the opposite sex. This already implies a certain degree of
interest outside the individual; a certain degree of objection. If
epilepsy represented a lower stage in adaptation, then we should look for
the point of fixation in the stage of "mother's life" and that Dr. Clark
had apparently discovered. He tells us that epileptics are intensely egotis-
tical, which points to a failure of objection; that the conflicts of the
world, which is another evidence of egoism, were nothing to them; and
finally, he has made the very interesting observation that there is a
definite desire to return to the mother's body. That is an extraordinary
claim, yet we see it in other psychoses. The speaker said he recently
saw an epileptic who claimed that during his convulsion he went back to
his mother's womb, which he very much enjoyed.

Dr. Smith Ely Jelliffe said that the *mutterleib's phantasy* was met
with in various phenomena in addition to the epilepsies such as in various
conversation and compulsive phenomena. Dr. Clark apparently would
apply a general situation present in the psyche of all individuals as ex-
planatory of a specific phenomenon. It would be of practical interest in the
analysis of the epileptic phenomena to see just how the individual had
evolved the universally present Œdipus situation through the individual
muscle erotic gratification. It was no solution to say that these patients
showed an introversion type in phantasy everybody does that. The answer
should show how did the epileptics work out their phantasy, not in har-
monious muscular activity, but in the discordant and nonadaptive epileptic
discharge.

Dr. Clark, in closing, said he had not included the definitely organic
cases of epilepsy in his study, and that for the time being he wished to
limit his interpretation of the mechanism of epilepsy to that of the so-
called idiopathic group. He might say, however, that he had seen several
cases of epilepsy which followed in the wake of infantile cerebral palsy
in which the mechanism of the attack was quite identical with those he
had studied in essential epilepsy as embraced in his paper. He cited the
fact that Binswanger, Gowers and Oppenheim had all indicated that the
essential makeup in personality and the enduring mental stigma of the dis-
ease were, to all intents and purposes, identical in epilepsy following cere-
bral palsies as compared with that of idopathic epilepsy. From this and
other data in hand he was willing to admit that the possible real genesis
of the epileptic state might be organic at bottom. But where persistent
attacks occurred, his contention was that the organic insult merely per-
mitted or allowed the mechanism of epilepsy to occur as he tried to show
it to have done in his study.

Translations

VAGOTONIA

A Clinical Study

By Privatdozent Dr. Hans Eppinger and Dr. Leo Hess

OF VIENNA

Translated by Walter Max Kraus, A.B., M.D., and Smith Ely Jelliffe, M.D., Ph.D.

(Continued from page 176)

It is to be expected that there should exist some hormone in the body which would be an antagonist to adrenalin, and in the light of this we must feel that there is an autonomin which has a selective action upon the autonomic system, just as adrenalin has upon the sympathetic.

However, we know neither its source nor its constitution. But a few substances are known which have a stimulating action upon some parts of the autonomic system. Thyroid stimulates the intestine, the sweat and salivary glands. Infundibulin seems to act only upon the pelvic nerve, leaving other branches unaffected. Formerly it was felt that in cholin, a substance present in every cellular organ of the body, there had been found the universal autonomin. When one considers, however, what large amounts of this substance are necessary to bring about stimulation of the autonomic, it, in contrast to adrenalin, seems very little likely to be able to play a prominent physiological part. Finally we must not omit to remark that substances may be isolated from various organs, which as far as their action upon blood-pressure goes, may be considered autonomic stimulants. The experiments with these substances seem to us not to be entirely reliable, since the substances were never obtained in the pure states. This leads one to believe that the action upon the autonomic system may have been due to the presence of peptone as an impurity. While physiology has yielded us no certain knowledge of any hormone except adrenalin, yet certain disease complexes give us a hint

where autonomic stimulants are produced. It has been felt that extirpation experiments will show the way by which to approach the sought-for goal.

Up to now this method has only been of value in metabolic questions. On the basis of this method, it has been ascertained that the pancreas may be the site of production of autonomic stimulation. Its secretion probably acts in opposition to that of the chromaffin system, since when it is absent, the full action of the chromaffin hormone is felt, at least, as far as metabolism is concerned. Depancreatized dogs showed neither tachycardia nor increased blood-pressure. Only as far as the pupil is concerned are we certain of any increase in the tone of the sympathetic system. The thyroid must, as far as metabolism is concerned, furnish sympathicotropic substance, since feeding thyroid causes an increase in metabolism as does adrenalinemia, and also favors alimentary glycosuria, *i. e.*, lowers sugar tolerance.

Lack of thyroid, on the other hand, increases tolerance for carbohydrates, and furthermore this tolerance may remain the same in spite of administration of adrenalin.

We could present many other facts which go to prove that the various organs produce sympathicotropic and vagotonic impulses, but only those facts relative to metabolism can be presented, while the action upon the tone of smooth musculature and upon the activity of the other glands can scarcely be more than touched upon. We may expect by analogy to the action which we know is exerted upon metabolism by the glands of internal secretion, that they would also exert an inhibitory or stimulative action upon other vegetative functions.

The question now arises whether some clue may not be derived from general pathology, which may strengthen our idea that in the absence of certain endocrinous glands, there exists some condition analogous to vagotonia. The best example of this is Addison's disease, in which the organ from which sympathicotropic impulses arise, is absent. If we test the symptoms of this disease, we find the following: emaciation, diarrhea, lowered blood-pressure, pigmentation, sweating, general adynamia, high sugar tolerance and frequently hypoglycemia.

The diminution in blood-pressure and blood sugar is surely referable to the lessened activity of the chromaffin system. In addition there are conditions like those resultant upon autonomic

stimulation: Sweating, diarrhea, which in comparison to their insignificance in the basic disease, tuberculosis, are very prominent. There are anatomical findings in typical Addison's disease besides those in the adrenals, *i. e.,* a general lymphatic enlargement. The thymus also is enlarged, it being not only persistent in adults, but also not infrequently hyperplastic. The question of whether or not the thymus belongs to the lymphatic system will not be discussed in this paper. This fact must be added, that while the clinical picture of Addison's disease always is associated with diseased adrenals, diseased adrenals may not always cause a symptom-complex identical to Addison's disease. One is not infrequently astonished to find at autopsy that the adrenals are severely diseased, a diagnosis which could not be made in vivo due to the lack of any significant symptoms. And furthermore, every case does not show, at section, an enlarged lymphatic system and a hyperplastic thymus. Finally, adrenalin injections benefit the symptoms of Addison's disease.

This coincidence between adrenal disease and lymphatism or thymus hyperplasia was first observed in the cadaver by Wiesel,[32] Hedinger[33] and Hart.[34]

These authors suggest that apparently primary lymphatism might be due to inferiority of the chromaffin system. Wiesel stated that the adrenalin-producing system was poorly developed just in that group of cases in which status thymicus was most marked. The question now arises, what knowledge concerning this relationship may be gained by considering the clinical and anatomic findings in Addison's disease. If the conception of vagotonia as the opposite to that constitutional state in which the adrenalin-producing organs dominate metabolism and smooth muscle activity be correct, there can be no doubt that Addison's disease may be considered as an exaggerated form of vagotonia.

Unfortunately our knowledge of the functions of the autonomically innervated organs is as yet very scanty.

This we have been able to augment a little. Besides we must not overlook the probable effects of a state of inanition, such as found in Addison's particularly upon the functions which the

[32] Wiesel, J., Virchow's Archiv., 176, p. 103, 1904; Beiträge zur pathol. Anatomie und allg. Pathologie, 37, p. 168, 1904.

[33] Hedinger, Verhandl. der XI Tagung der Deutschen pathol. Gesellschaft, p. 29, 1907. Frankfurter, Zeitsch. f. Pathologie, 1, p. 527, 1907.

[34] Hart, Weiner klin. Wochenschrt., 21, p. 1119, 1908. Zentralblatt für die Grenzgebiete der Medizin und Chirurgie, 12, p. 321, 1909.

smooth muscles subserve. Thus we never have a truly clear-cut picture. But in spite of this the symptoms of vagotonia are so outspoken in Addison's disease that we must of necessity regard it as a general secondary vagotonia. In spite of the inanition, hyperacidity and evidence of increased gastric tonus are not infrequently found in Addison's. The enormous development of the lymphatic tissue and the frequency of thymus hyperplasia, found in autopsy, in those who have died of Addison's, and similar findings in those who clinically were vagotonics, lead us to believe that a relationship exists and that perhaps the manifestations of vagotonia are related to the pathological conditions in the thymus and the marked enlargement of the lymphatic tissues.

(To be continued).

Periscope

XXIV. *Optic Atrophy in Tabes.*—Stargardt writes a monographic article on the disputed question of optic atrophy in tabes and progressive paralysis. He concludes that the changes do not take place primarily in the retina, as has hitherto been assumed, but that in the diseases under consideration the cause must be sought in some part of the optic tract. He also reaches the definite conclusion, important for therapeutic reasons, that optic atrophy should no longer be regarded as due to a meta-syphilitic poison, but rather as a direct action of the spirochetes. The conclusion is inevitable, that every possible means should be taken to combat the disease at its source, through salvarsan combined with mercury. The difficulty is through chemical means to reach the actual foci in the nerve tissue. Whether or not a more direct method may be practiced is still open to question.

XXV. *Pupillary Reactions.*—Runge attempts a study of pupillary phenomena as observed in mental disease and in healthy individuals. Following the more recent work of Bumke, the writer has investigated the finer movements of the iris in a great variety of conditions, both normal and pathological. The details of this investigation are not possible to give in the scope of a brief review on account of the large amount of statistical material used. In general, it appears that certain definite conclusions may be reached regarding the pupils under various conditions of disease apart from the well-recognized Argyll-Robertson type. The physiology of the reflex is discussed at length.

XXVI. *Gynecology and Psychoses.*—König and Linzenmeier reach the following general conclusions from a study of gynecological conditions in relation to the psychoses: Proof that psychoses are caused by such conditions is not forthcoming; how far ovarian secretion may have relation to mental disturbances is as yet not known; local cure has no influence on the course of a psychosis; the question of suggestion in such cases is important; gynecological examinations and treatment may be

practised on mental cases without danger, but are only indicated for purely local reasons: it is undesirable to attempt to restore menstruation; operative intervention should be undertaken when possible under conditions of complete narcosis.

XXVII. *Psychoanalysis.*—Hoche makes a somewhat bitter attack on the principles of psychoanalysis as enumerated by Freud and his followers. He believes that psychoanalysis is justified neither on theoretical nor empirical grounds; that its therapeutic efficiency is unproved; that its permanent value for clinical psychiatry amounts to nothing; that the impression it has made depends upon thoroughly unscientific methods; that the practice of psychoanalysis as now largely used is a danger to the nervous system of the patient and a reflection upon the medical profession; and finally, that the only permanent interest in the subject lies in the field of its relation to the development of culture in the broad sense.

XXVII. *Glandular Layer in Cerebellar Disease.*—Bériel offers a brief histological study of the outer layer of the cerebellum on the basis of the investigation of a single case suffering from paraplegic spastic disturbance. A special study is made of certain encephalitic areas on the surface of the cerebellum.

XXIX. *Muscular Dystrophy.*—In this article, Klieneberger gives the clinical history of a case of muscular dystrophy with myotonic disturbances combined with painful paresthesia and certain other disturbances. The article is a significant contribution to the obscure subject of the muscular diseases.

XXX. *Psychiatry and Medicine.*—Becker outlines the relations of gynecology, obstetrics, internal medicine, ophthalmology, otology, dermatology, and dentistry, and shows (as it is not difficult to do) the important bearings which each of these special fields in medicine have upon the mental life of the individual.

E. W. TAYLOR (Boston).

Deutsche Zeitschrift für Nervenheilkunde

(51 Band, 1-2 Heft)

1. Some Unusual Manifestations in Hemiplegia. PANSKI.
2. The Diagnosis and Therapy of Tumors of the Parietal Lobes. VÖLSCH.
3. The Symptomatology of Cerebral Paralysis. BERGMARK.
4. A Case of Acute Hemorrhagic Encephalitis of the Pons with Extensive Bleeding. BERG.
5. A Case of Syphilitic Spinal Amyotrophy of the Shoulder Girdle. KUMMANT.
6. Recurrent Polyneuritis. HOESTERMANN.
7. A Further Contribution to Our Knowledge of Muscle-cramp, Peripheral Origin and Relation of Symptoms. BITTORF.

1. *Unusual Manifestations in Hemiplegia.*—The writer without considering the relative frequency of these manifestations, speaks of disturbance of taste, furred tongue and blisters, pseudobulbar palsy and diabetes.

2. *Tumors of the Parietal Lobes.*—In the matter of diagnosis, emphasis is laid upon the early appearance of spastic hemiparesis and dissociation of sensation. Finally, the new and much spoken against method of brain puncture should be resorted to.

4. *Hemorrhagic Encephalitis of the Pons.*—Berg tells of a perplexing

case and one of unusual interest where death occurred suddenly in a young and healthy individual. The autopsy report and microscopic findings are detailed. Clinically, there were spastic symptoms in the left arm and leg, right sided flaccid paralysis with irritative symptoms of the right oculomotor nerve. These symptoms pointed to an affection of the pons. The attack was apoplectiform in nature and in the absence of evidence pointing to thrombosis or embolism, the presence of hemorrhage was suspected. This was confirmed at necropsy. During the course of the disease, a lumbar puncture yielded fluid sanguinolent in nature, that is, the blood was uniformly mixed and not coagulated; this also pointed to a " natural" hemorrhage.

5. *Syphilitic Spinal Amyotrophy of the Shoulder Girdle.*—The data upon which this diagnosis was based are: (1) Twenty years before there was a luetic infection. (2) Since the last two years there had developed a progressive atrophy chiefly of the musculature of the shoulder girdle, with the cerebral symptoms of headache and dizziness, with the spinal symptoms of bowel and bladder disturbance, together with exaggerated reflexes and sensory changes. (3) A positive Wassermann in the blood and cerebrospinal fluid. (4) Positive result in Nonne-Apelt reaction and lymphocytosis amounting to 30 in cmm. of cerebrospinal fluid. (5) Slight increase in temperature.

7. *Muscle-Cramps.*—This further contribution speaks of muscle cramps as occurring in the conditions of myokymia and myotonia, in alcoholism, in exposure to intense heat and in muscular rheumatism. The cause is for the most part a toxic substance causing a neuritis or a neuromyositis.
YAWGER (Philadelphia).

THE PYRAMIDAL TRACT IN THE RED SQUIRREL (*Sciurus hudsonius* Loquax) AND CHIPMUNK (*Tamias striatus* Lysteri). Sutherland Simpson. (The Journal of Comparative Neurology, Vol. 24, No. 2.)

The cortical motor areas in the left cerebral hemisphere were extirpated in three red squirrels (*Sciurus hudsonius* Loquax) and three chipmunks (*Tamias striatus* Lysteri) and the resulting degeneration followed by the Marchi method.

The pyramidal tract occupies the usual position in the crusta, pons and medulla oblongata until the decussation is reached. Here, in the lower part of the bulb, the fibers cross the middle line abruptly in bundles which interlace with those of the sound side and pass through the gray matter into the funiculus cuneatus where they turn caudalwards to enter the spinal cord and form the crossed pyramidal tract. The decussation is complete, no fibers remaining on the same side when the spinal cord is reached. There is no sign of a crossed lateral tract. The dorsal tract can be followed as far as the lower sacral segments. A considerable number of degenerated fibers disappear in the upper cervical segments of the spinal cord.
JELLIFFE.

Motes and Mews

THE PHILADELPHIA POST–GRADUATE SCHOOL OF NEUROLOGY

The neurological wards of the Philadelphia General Hospital offer unusual facilities for post-graduate instruction in nervous disease, these wards containing about four hundred patients illustrating all forms of organic, functional, and psychopathic disease. The Philadelphia Hospital for the Insane, which is a part of the General Hospital and situated on the same grounds, has more than two thousand patients.

All the members of the neurological staff of the Philadelphia General Hospital are connected with neurological services in other hospitals and institutions, which will enable them to supplement the instruction given at the hospital. With the approval and encouragement of the Director of the Department of Public Health and Charities, Dr. Richard H. Harte, the neurological staff has organized a post-graduate school of neurology. The time is opportune for this step. Owing to the terrible war in Europe, it will probably be one or two years at least before American students can avail themselves of the neurological clinics and laboratories of London, Paris, Vienna, Berlin, Rome, and other centers of medical instruction abroad.

Instruction will be arranged in four periods of six weeks each, one, two, three or four of which can be taken by the students. The first course of six weeks will begin Monday, December 7, 1914, and continue until the end of January. The second and third courses will be in February, March, April, and May. Special short courses of two or three weeks each can be arranged for the months of June, July, August, and September. The instruction will be given by the members of the neurological staff of the Philadelphia General Hospital and their assistants.

The staff is composed of eight members, four of whom are on duty from August 1 to February 1, the other four from February 1 to August 1. A limited number of clinical lectures will be given, but in the main the instruction will be in the nature of ward visits and conferences. Short special courses on serology, pathology, neurological ophthalmology, and the jurisprudence of nervous disease and insanity will be offered in connection with the clinical teaching. The time of the students will be fully occupied.

The fees for each period covering all branches taught will be twenty-five dollars. The only extra fees will be in courses like serology and pathology where an amount sufficient to cover the necessary expenses will be charged.

The faculty is composed of the following members of the neurological staff of the Philadelphia General Hospital: Dr. Charles K. Mills, 1909 Chestnut Street; Dr. Charles W. Burr, 1918 Spruce Street; Dr. William G. Spiller, 2046 Chestnut Street; Dr. James Hendrie Lloyd, 116 South 21st Street; Dr. Charles S. Potts, 2018 Chestnut Street; Dr. D. J. McCarthy, 2025 Walnut Street; Dr. T. H. Weisenburg, 2030 Chestnut Street; Dr. George E. Price, 1700 Walnut Street.

Dr. Francis X. Dercum, 1719 Walnut Street, consulting neurologist

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to the hospital, and a former active member of the staff will take part in the instruction.

For information address

DR. CHARLES K. MILLS, *Dean,*
1909 Chestnut Street,
Philadelphia.

The Los Angeles County Psychopathic Hospital, recently erected upon the grounds of the County Hospital, has been opened as a psychiatric department of this institution. It can comfortably accommodate about seventy-five patients and has a complete hydrotherapeutic equipment. It is intended to serve as a place of detention for persons suspected of being insane until their cases are investigated and a disposition is made of them, to furnish treatment for acute cases likely to recover within a short time, to serve as a center for the dissemination of information with regard to insanity among the general public and as station for field work. It will also furnish to students and physicians excellent facilities for the study of psychiatry since the psychiatric material of Los Angeles is unsurpassed anywhere in the west.

The hospital is under the general direction of Superintendent Whitman with Dr. C. L. Allen as psychiatrist in charge.

PROGRAM OF THE AMERICAN NEUROLOGICAL ASSOCIATION

Post Natal Growth of the Brain Under Several Experimental Conditions. By Drs. Donaldson, Hatai and King.

The Relation of Structure and Function in the Nervous System. By Dr. Stewart Paton.

Ventricular Hemorrhage. By Dr. Alfred Gordon.

Alexia and Astereognosis. By Dr. F. R. Fry.

Report of Two Cases of Epilepsy with Unusual Vascular Findings. By Dr. E. Sachs.

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Report of a Case of Pituitary Tumor. By Dr. W. M. Leszynsky.

Note on the Physiology of the Pars Anterior of the Pituitary Body. By Dr. Alfred Reginald Allen.

Hormone Therapy in So-called Nervous Disease. By Drs. Joseph Collins and Henry Marks.

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Dilatation of Cerebral Ventricles in Various Functional Psychoses. By Dr. E. E. Southard.

The Intelligence Tests in the Psychoneuroses. By Dr. C. L. Dana.

The Study of Temporary Abnormal Mental State, Conforming to Recognized Types of Psychoses. By Dr. S. I. Schwab.

The Development and Operation of the Laws for Hospital Observation of Cases of Alleged Mental Disease or Defect, in Massachusetts. By Dr. Henry R. Stedman.

Mental Disturbances in the Feeble-Minded. By Dr. W. N. Bullard.

The Mechanism of the Tic Neurosis. By Dr. L. Pierce Clark.

Clinical and Kinematographic Observations Illustrative of the Barany Methods in the Study of Vestibular and Cerebellar Disease. By Drs. T. H. Weisenburg and I. H. Jones.

Some Observations on the Use of the Barany Tests in Vestibular, Cerebellar and Cerebral Disease. By Dr. C. K. Mills.

Huntington's Chorea: Correlation of Hereditary and Pathological Factors. By Dr. S. E. Jelliffe.

The Family Form of Pseudo-sclerosis and Other Conditions Attributed to the Lenticular Nucleus. By Dr. W. G. Spiller.

A Case of Wilson's Disease, Progressive Lenticular Degeneration, with Pathological Findings. By Drs. F. Tilney and G. M. MacKenzie.

Lenticular Degeneration. A Report of a Case with Autopsy. By Dr. J. H. W. Rhein.

A Brief Review of a Year's Neuro-surgical Work, with Special Reference to Spinal Cord Lesions. By Drs. B. Sachs and C. A. Elsberg.

Some Abnormalities of the Posterior Spinal Vessels; Their Symptomatology and Treatment. By Dr. C. A. Elsberg.

Preliminary Report on the Treatment of Paresis by Injections of Salvarsan and Definite Doses of Neosalvarsan into the Lateral Ventricle. By Drs. G. M. Hammond and Norman Sharp.

Observations on Hereditary Syphilis Affecting the Nervous System. By Dr. C. D. Camp.

Diagnosis and Treatment of the Various Forms of Meningitis. By Dr. H. A. Cotton.

Circumscribed Purulent Meningitis Limited to Frontal Lobe; Due to Sinusitis. By Dr. Samuel Leopold.

Meningitis Sympathica. By Dr. Israel Strauss.

Histopathological Findings in a Case of Landry's Paralysis. By Dr. E. D. Fisher.

A Case of Central and Peripheral Neuro-fibromatosis (von Recklinghausen's Disease). By Dr. Peter Bassoe.

Spondylitis. By Dr. B. Sachs.

The Nature and Location of Tumors of the Spinal Cord. By Dr. C. L. Dana.

A Frequency List of Mental Symptoms Found in 17,000 Institutional Psychopathic Subjects (Danvers State Hospital, Massachusetts). By Dr. E. E. Southard.

The Development of the Brain from the Stage of Neural Plate to Term as Shown by Borne Reconstruction Models Obtained from the Domestic Cat. By Drs. F. Tilney and H. von W. Schulte.

Syphilis of the Nervous System without Pathognomonic Signs. Its Frequency of Occurrence and Clinical Display. By Dr. Joseph Collins.

The Tardy or Late Paralysis of the Ulnar Nerve. By Dr. J. Ramsay Hunt.

The Supra-optic Canal in its Probable Relations to the Phenomena of Choked Disc. By Dr. F. Tilney.

Original Articles

A STUDY OF THE SPINAL CORD IN A CASE OF ISO-LATED ATROPHY OF THE SMALL MUSCLES OF THE HANDS*

By Mary Elizabeth Morse, M.D.

The purpose in reporting this case is twofold: first to describe the pathological changes in the cord in a case of isolated atrophy of the intrinsic muscles of the hand, and secondly to locate the cell groups for these muscles in the cord.

Pierre Marie and Foix[1] have recently distinguished among the muscular atrophies a group characterized by strict limitation to the small muscles of the hand, with unilateral predominance, of slow evolution, and non-progressive nature. The authors have collected 13 such cases, 4 with autopsy. They divide them into two groups according to the presence or absence of signs of syphilis in the nervous system. One half of their cases were syphilitic, the other half probably not so. The lesion found was a localized destruction of the anterior horn, unaccompanied by marked inflammatory or neuroglia reaction, at the level of the lower half of the seventh cervical, the eighth cervical and the upper half of the first dorsal segments. To this condition the authors gave the name " anterior tephromalacia." In the syphilitic cases the meningo-vascular lesions are those usually found

* From the laboratory of the Worcester State Hospital, 1915-1.

in spinal syphilis. The meningeal lesions and perivascular infiltration may however be absent, leaving only a considerable thickening of the walls of the arterioles. The authors therefore conclude that senile arteriosclerosis is here capable of producing lesions analogous to those of syphilis. The white matter is almost entirely normal. The cause of the lesion in all cases, the authors believe, is a progressive ischemia, due to a thickening of the vessels in the territory supplied by the sulco-commissural arteries.

Leri,[2] in discussing the frequency of syphilis in the etiology of the various muscular atrophies, considers this form to be of luetic origin, and mentions that it may be found in connection with an Argyll-Robertson pupil, a positive Wassermann reaction in the serum, or lymphocytosis in the cerebrospinal fluid. He calls the condition a true vascular syndrome of the anterior horns.

In regard to the second point raised by the present case, i. e., the localization in the cord of cell groups for various muscles, it may be said that the question has been studied experimentally in animals by observation of the location of the degenerated nerve cells following the excision of single muscles or groups of muscles, the section of nerves, or disarticulation at various joints. In man conclusions have been drawn chiefly from amputations. Bikeles'[3] researches have shown that the cell groups which degenerate in consequence of the resection of a given nerve have essentially the same location in the dog, cat and monkey. The results obtained from animal experiment agree with those found in the human cord, as far as the latter has been studied. In man the topography of the lumbosacral enlargement is better known than that of the cervical, in the first place because more lumbosacral cords have been studied, and in the second because the cell groups are here more detached than in the cervical. On account of its strictly differential character, the present lesion offers an excellent opportunity, and one which has apparently not been utilized, of determining the position of the cell groups for the muscles of the hand.

The intrinsic muscles of the hand are supplied by the ulnar nerve, with the exception of the abductor, the opponens, the outer head of the flexor brevis pollicis, and the two outer lumbricales. The latter group is innervated by the median, which arises from the fifth to the eighth cervical and the first thoracic nerves. The

ulnar is derived from the eighth cervical and first thoracic nerves. As the upper part of the origin of the median doubtless represents the muscles of the forearm, it is particularly in the lower part of the cervical cord and in the first dorsal segment that lesions may be expected in atrophy of muscles of the hand.

The cell groups[4] that are present in this region, for either the whole or a part of its extent, are the anterior and posterior mesial, the antero-lateral, the postero-lateral, and the post-postero-lateral. The antero-mesial column is small from the fifth to the eighth segment, but in the lower part of the eighth and in the first dorsal attains large size. A posterior mesial group cannot be differentiated in all sections. The antero-lateral group (lower part) reaches its greatest development in the seventh, then gradually diminishes, and disappears at the lower part of the eighth segment. The posterolateral column is at its maximum in the fifth and sixth segments, decreases in the seventh, to increase again in the upper half of the eighth. The post-posterolateral group appears first in the eighth, behind the inner part of the postero-lateral column. It increases in size throughout the lower part of the eighth, coincidently with the diminution of the posterolateral group. It continues through the first dorsal, where it forms the prominent posterolateral angle, and disappears at the second dorsal segment.

There is general agreement that the mesial group is the cell column for the trunk musculature,[5] the anterior mesial representing the muscles anterior to the vertebral column, e. g., the scalenii, the ileo-psoas, etc., and the posterior mesial group the long muscles of the trunk. The anterolateral group is probably connected with the anterior muscles of the neck, the intercostals and the shoulder and pelvic musculature. The posterolateral columns are the centers for the muscles of the limbs. There is evidence that the post-posterolateral group in the cervical cord is concerned with the muscles of the hand, and its homolog in the sacral cord with those of the foot. Marinesco[6] found degeneration in this column after disarticulation of the forepaw in a dog, and also in a human case following amputation of the fingers. Van Gehuchten and Nelis[7] observed chromatolysis of all the cells of this column in the sacral cord of a human case after amputation of the feet, and the former author therefore calls it " the nucleus of innervation of all the intrinsic muscles of the foot."
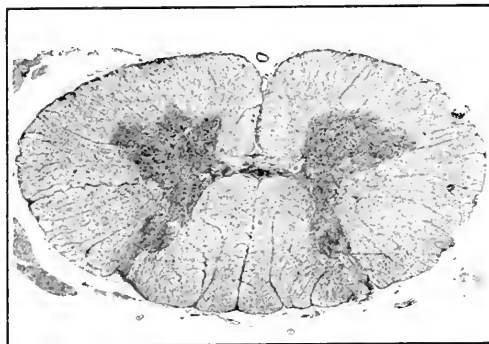
FIG. 1.   Upper part of eighth cervical, showing difference in size and shape of anterior horns and loss of cells in the right posterolateral and post-posterolateral groups.
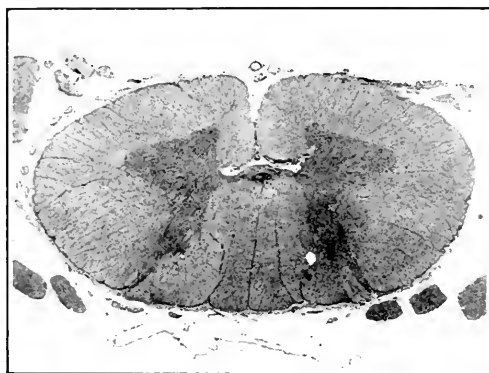
FIG. 2.   Lower part of eighth cervical.
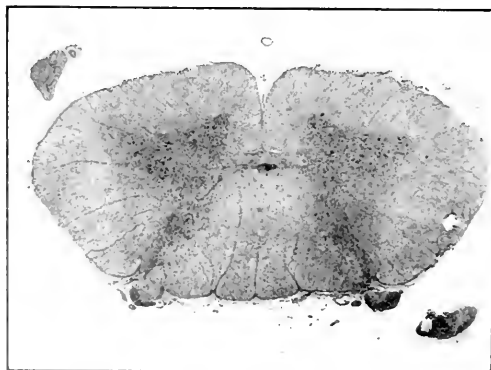
FIG. 3.   Upper part of first dorsal.   Almost complete devastation in right post-posterolateral group.
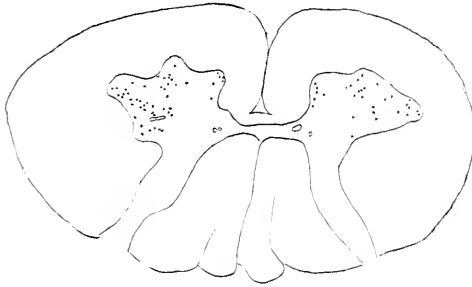
Fig. 1a. Projection drawing of same section.
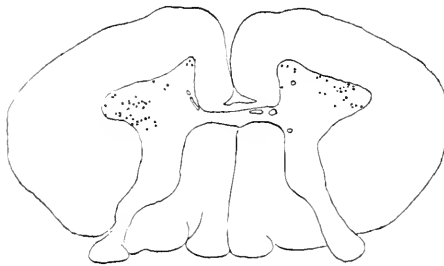
Fig. 2a. Projection drawing of the section following Fig. 2.
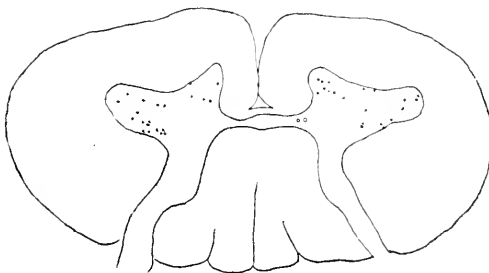
Fig. 3a. Projection drawing of a section near Fig. 3.

The cell groups for the different nerves of the limbs are, however, not sharply defined. According to Marinesco[8] the nucleus of the ulnar and that of the median are fused into a single mass, which may be explained by the fact that embryologically the ulnar nerve is an offshoot of the median. Marinesco locates this common nucleus, at the level of the seventh segment, at the posterior border of the anterior horn, in a line extending from the postero-external angle to the posterior horn. The cells of the median are placed at a higher level than those of the ulnar, the latter predominating in the eighth cervical and first dorsal. In the eighth cervical the cells of the ulnar extend around onto the external border of the anterior horn, while at the level of the first dorsal they are placed exclusively in the posteroexternal group of the posterolateral column. Bikeles and Franke[9] after resection of the median and ulnar nerves found the degenerated cells in the median part of the posterolateral group in C7 and C8, where they reached the posterior border of the horn.

CASE: The present case is that of a man, 58 years old, who was admitted to the Worcester State Hospital, June 9, 1913. The past history was not obtained, but it was stated that the patient had used alcohol to excess for 25 years. On admission he was depressed and apprehensive with a sense of impending death; retrospective and self-accusatory. Physical examination revealed nothing noteworthy except the condition of the hands.

Description of the Hands.—The right hand bore a large scar, with considerable fleshy deformity, on the ulnar side of the wrist, and also showed the loss of the fourth and fifth finger tips. There was very marked atrophy of the muscles of the thenar and hypothenar eminences and also some atrophy of the interossei. The left hand showed a slighter atrophy, but a fairly definite shrinkage of the thenar and hypothenar eminences. No evidence of atrophy of the interossei on the left.

The patient died ten days after admission of bronchopneumonia. The psychiatric diagnosis was the depressed phase of manic depressive insanity.

Autopsy, two hours after death, showed in addition to bronchopneumonia, a moderate sclerosis of the aorta with a few calcified plaques. The calvarium was very thick and dense. The dura was slightly tense, opaque, and somewhat thickened. There was a small amount of clear subpial fluid. The brain weighed 1,435 grams and was of a uniformly soft consistence, no focal lesions of any type. The ventricular floors were smooth. The basal vessels showed slight sclerosis.

Microscopic examination of the trunk organs added nothing of importance.

Technical Methods.—Sections from the pre- and post-central, the frontal, temporal, occipital and hippocampal cortices, the cerebellum, the medulla and the upper cervical, middorsal and lumbar regions of the cord were stained by the Nissl and Weigert methods and by Mallory's phosphotungstic acid hematoxylin method for neuroglia. The remainder of the cord was fixed in formalin, and the region from the upper part of the seventh cervical through the second dorsal was embedded in paraffin, cut in serial sections of 6μ thickness, and stained in thionin. Every fifteenth to twentieth section was described, and the cells in the various groups on each side counted.

Examination of the Nissl sections from the various cortical areas gave the following results. The pia in the intergyral spaces shows a moderate increase in fibrous tissue and a sprinkling of lymphocytes and large endothelial cells. Cortical architecture is normal. The nerve cells, with the exception of those surrounded by satellites, stain well, contain a good complement of Nissl bodies and small amounts of lipochrome. Many of the cells in the infrastellate layers are surrounded by satellites. This reaction is most marked in the postcentral and frontal cortices and in the deeper parts of the pyramidal layer of the hippocampus; less marked in the temporal and precentral regions, and does not exceed normal in the occipital cortex. The vessels, both pial and cortical, are considerably thickened. The great majority of them are free from exudate, although a slight excess of lymphocytes may be detected in a few places. In the white matter there are small perivascular collections of green pigment. The sections stained for neuroglia show a moderate general thickening of the glial mat, with some extension into the zonal layer, considerable perivascular gliosis and an increase of glia nuclei in the white matter. The Weigert sections are not remarkable. Sections of the medulla at the level of the upper and the middle parts of the olives, and of the decussation of the pyramids show a moderate thickening of the peripheral glia, normally staining nerve cells, vascular thickening as in the cortical areas, groups of satellites about a few cells and a slight lymphocytic reaction about a few vessels.

Spinal Cord.—Sections from the third, fourth, fifth and sixth cervical segments show no difference in the representation of the cell groups on the two sides. There are, however, scattered atrophic cells on both sides in all segments. The vessels, both in the pia and cord, are considerably thickened, but are free from exudate. There is a peripheral gliosis about the anterior fissure and at the point of entrance of the posterior roots.

Description of the Lesion.—Beginning in the upper part of C7

with serial sections, there is apparent macroscopically in the first third of the segment a slight flattening of the right anterolateral border of the cord. There is no difference in the size of the horns, but the right is more nearly rectangular than the left, due to lack of projection of the anterolateral, and more particularly the posterolateral group. Microscopically a few abnormal cells are found distributed through the anterior horns. These cells are shrunken and angular, have visible processes and stain deeply, but as a rule they contain Nissl bodies. In the central regions of the anterior horns are a number of small nerve cells surrounded by clusters of eight or nine satellites. Counts of cells in the mesial and antero and posterolateral groups show no significant differences between the sides. There is a focus of lymphocytic infiltration about the vessels in the anterior fissure, extending vertically through half a dozen sections, and also a sprinkling of lymphocytes about several small arteries in the anterior horns. Areas of hemorrhage are present in the gray matter. The corpuscles in these are intact and there is no cellular reaction or pigment formation associated with them.

In the middle third of C7 a slight but definite narrowing at the root of the right anterior horn, as compared with the left, becomes perceptible macroscopically. This corresponds microscopically to a cell loss in the posterolateral group, which is evident both on inspection and by cell counts. The diminution of cells is by no means constantly found, the right posterolateral group often showing as many or occasionally even more cells than the left. The gaps are situated sometimes at the tip of the posterolateral angle, sometimes along the posterior border of the horn, or in both locations. Cell counts in the other columns show no important differences on the two sides.

In the lower third of C7 cell losses in the above mentioned locations become more numerous on the right side. There is also in a few sections a suggestion of a scarcity of cells in the posterolateral groups on the left. The anterolateral group on the right appears in a number of sections to be poorly provided with cells in comparison with the left side. Quite marked lymphocytic infiltration is present at one point about a sulcal artery and its branch to the right anterior horn; less marked around that to the left horn.

The lesion increases in C8, but cell counts show that both posterolateral and post-posterolateral are less affected in the middle than in either the upper or lower thirds of the segment. The meaning of this is not clear. The lesion increases suddenly at the lowest portion of C8. Throughout the segment the right anterior horn is smaller than the left in all its dimensions and the right posterior horn is also more slender than the left. Atrophic cells are numerous in all groups, and a number of cells showing

the axonal reaction are present in the anteromesial groups. There are also a few faded blurred cells with finely granular cytoplasm and nuclei which stain faintly or not at all. Small collections of lymphocytes accompanied by phagocytes laden with olive green pigment occur not only about vessels in the anterior horns, but also occasionally in the posterior horns. Hyaloid droplets are found both in the gray and white matter.

The shrinkage of the right anterior horn is due to a loss of cells in a definite situation, which is at the posterior surface of the anterior horn at its junction with the posterior horn, and in a slightly smaller number of sections along the posterior border of the anterior horn. In some sections there is loss in both these regions, and in an occasional section a gap in the group at the tip of the posterolateral angle. On the left side also gaps occur in a number of sections in the same groups. The cell losses, are, however, almost exclusively at the junction of the anterior and posterior horns, and do not extend to the posterolateral angle.

The post-posterolateral group contains in the majority of sections of C8 fewer cells on the right, but on the other hand, as has been said, there are sections in which it shows a poor representation of cells on the left.

The maximum of the lesion is reached in the lower part of C8 and the upper third of DI. The anterior horns show here their greatest difference in size. The anterior border of the eighth is almost straight instead of exhibiting the cup-shape, normal for the lower half of C8. The posterolateral angle is very sharp and the posterior border is flat, instead of showing the usual convexity, due to the post-posterolateral column.

In the lower third of C8 the right posterolateral group gives smaller cell counts than the left in 79 per cent. of the slides examined, in the upper third of DI, in 33 per cent., in the middle third in 20 per cent. The difference between the posterolateral groups decreases, therefore, as the group wanes. The brunt of the damage in the upper third of DI, is borne by the post-posterolateral group, which contains fewer cells on the right in 100 per cent. of the slides examined, as contrasted with 59 per cent. in the lower third of C8, and 67 per cent. each in the middle and lower thirds of DI. The loss in the post-posterolateral group has in places gone on to complete devastation.

Presented in tabular form, the figures are as follows:[1]

	Postero-lateral	Post-posterolateral
In upper third of C8 smaller counts on right in	.72	.60
In middle third of C8 smaller counts on right in	.50	.15
In lower third of C8 smaller counts on right in	.79	.59
In upper third of DI smaller counts on right in	.33	1.00
In middle third of DI smaller counts on right in	.20	.67
In lower third of DI smaller counts on right in	—	.67

[1] Each of these percentages represents 15 to 20 counts on separate sections.

It is seen that the maximum of the lesion in the two groups falls at different levels, i. e., for the posterolateral at the lower third of C8 and for the post-posterolateral in the upper third of DI.

A thinning is apparent in a number of sections in the central group on the right, and also in the substantia gelatinosa.

The microscopic changes are of the same character as described above. The nerve cells in all groups show various degrees of degeneration and are occasionally surrounded by satellites, some of which suggest neurophages. Perivascular infiltration is of the same focal type as at higher levels, and is not more marked here than elsewhere. The neuroglia is not notably increased either in the gray or the white matter. The pia is slightly thickened in a few sections at the point of exit of the anterior roots, but as a rule appears normal except about the infiltrated vessels in the anterior fissure. The white matter appears normal. In the lower third of DI, the difference in the size of the horns becomes less marked on account of the disappearance of the posterolateral group. The difference in the post-posterolateral groups is maintained throughout the segment. Atrophic cells are found, but no perivascular infiltration. By the time the second dorsal is reached the abnormal cells have disappeared. In two sections from the lower dorsal region the nerve cells all stain well and are present in equal numbers on the two sides.

A section from the third lumbar shows conditions resembling those in the cervical enlargement, but of a mild character. There is a sprinkling of lymphocytes about the vessels in the anterior fissure, hemorrhages and hyaloid droplets in the gray matter, a few atrophic cells, a few others showing the axonal reaction, and clusters of satellites about some of the smaller nerve cells in the centers of the anterior horns. There is, however, no apparent cell loss.

Sections stained to bring out the neuroglia show at the cervical, dorsal, and lumbar levels, a moderate thickening of the peripheral glia with prolongations into the white matter, and also considerable perivascular gliosis. No gliosis in the gray matter.

The peripheral nerves were not separately examined but both anterior and posterior roots, as they are present in various sections appear normal

Discussion.—The present case undoubtedly belongs to the group described by Pierre Marie and Foix, but represents a much less advanced stage of the lesion than is found in their histological cases. In their illustrations the nerve cells on the affected side have completely disappeared at the maximum of the lesion, and the anterior horn is reduced to a linear cicatrix. The present

case is at a stage in which it is possible to determine the cell groups chiefly affected.

Unfortunately the etiology of the atrophy in this case cannot be settled owing to the absence of a Wassermann reaction. The perivascular lymphocytosis which is present in both brain and cord, is of course suggestive, but it is very mild, and the picture is certainly not the usual one of cerebrospinal syphilis. As to the theory of a progressive ischemia of arteriosclerotic origin, it must be said that the sclerotic changes are not very advanced in the vessels either of the viscera or of the central nervous system. The history of prolonged alcoholism points to a possible toxic origin, which is at least consistent with the perivascular gliosis in brain and cord, the peripheral gliosis, satellitosis and perivascular accumulations of pigment.

A point of importance in the pathology of the cord lesion is that affection of the nerve cells and perivascular infiltration are more widespread than would appear from the perceptible muscular atrophy. As has been pointed out, affected nerve cells occur in all groups on both sides and are present at levels above and below those at which cell loss can be demonstrated, and they also occur in the lumbosacral cord. Perivascular infiltration disappears in the dorsal region to reappear in the lumbosacral. This extensive involvement of the nerve cells links the condition with chronic anterior poliomyelitis (progressive muscular atrophy). In fact, in view of the prominent and widespread cellular lesions, the perivascular exudation and the changes in the lumbosacral cord, which apparently denote beginning involvement, we fail to see fundamental differences in the pathology of the two conditions, although of course clinically they are dissimilar. Marie and Foix, however, found that such nerve cells as were present appeared normal, and consider that this fact constitutes an essential difference between anterior tephromalacia and chronic anterior poliomyelitis.

The reason for the early and advanced involvement of the posterolateral and post-posterolateral groups of the cervical cord is not clear. The theory of a vascular distribution of the lesion was suggested by Marie and Foix. Perivascular exudate in the present case is limited to the sulcal branches of the anterior spinal arteries, and their branches to the anterior horns. The posterior

spinal arteries show no trace of exudate. A branch of the sulcal artery passes obliquely across the anterior horn, separating the posterolateral and post-posterolateral groups, but this vessel often shows no infiltration and indeed is less affected than the more anterior branches. It may be that the posterior groups are less well supplied with blood than the mesial and anterolateral groups.

Other factors than the vascular may also be considered in explanation of the selectivity of the lesion. In the first place, the neurones supplying the muscles of the hands are the longest in the upper extremity and would therefore presumably be early affected in any disease process.

Secondly, both phylo- and ontogenetic considerations may be of importance. The small muscles of the hand are a late development phylogenetically, are among the last of the upper extremity to be differentiated in the embryo, and are among the last, if not the last, muscles over which voluntary control is acquired.

It may be objected that the nerve fibers to the intrinsic muscles of the feet are longer than those to the hands, and that the latter develop earlier in embryonic life than the former.[10] It seems probable, however, that the great excess of exercise which the hand muscles receive, as compared with those of the feet, would outweigh these considerations and account for the earlier involvement of the hand muscles.

An additional possibility may be mentioned, which is that a primary disease of the peripheral nerve fibers might conceivably lead to entire destruction of their cells of origin. Alcohol or some other agent producing a peripheral neuritis might for unknown reasons select these particular fibers.

Finally, the localized muscular atrophy and the differential cell loss in the cord permit one to draw conclusions as to the distribution of the cell groups for the small muscles of the hands. The present case is a demonstration from human pathology that these groups are situated in the posterolateral and especially in the post-posterolateral columns, extending from the middle of the seventh cervical through the first dorsal segment. It does not seem possible on the basis of the present case to go farther and attempt to distinguish groups for the thenar, hypothenar and interossei muscles. The gaps on the left (on which there was atrophy of

the thenar and hypothenar muscles but not of the interossei) are situated as a rule at the angle between the anterior and posterior horns, while on the right (on which there was in addition atrophy of the interossei) they occur both at the angle, along the posterior edge of the horn and at the posterolateral angle. Nevertheless, the findings are not sufficiently different on the two sides to justify definite conclusions. It is probable also that the cells of origin of the median and ulnar are commingled.

Summary.—A case of isolated atrophy of the small muscles of the hands, of uncertain etiology in a 58-year-old man of alcoholic habits. The essentials of the lesion in the cord are:

1. Atrophic and degenerative changes in the nerve cells, widely distributed in the gray matter, but more prominent in the posterolateral and post-posterolateral columns.

2. Cell losses in the posterolateral and post-posterolateral columns.

3. Vascular changes, which consist in a thickening and a mild perivascular lymphocytic infiltration, the latter being confined almost entirely to the sulcal arteries and their branches to the anterior horns.

4. A characteristic distribution, the lesion commencing in the middle of the seventh cervical and extending through the first dorsal segment.

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CEREBELLAR SYNDROME*

By W. F. SCHALLER, M.D.

The subject which I have chosen, the symptomatology of cerebellar disease, is one that is alike of surpassing interest to the aurist, the oculist and the neurologist. The neurologist today must understand something of the functional ear tests as well as be able to handle an ophthalmoscope, and it is equally important for the man in special lines of work to know something of the ordinary neurological examination. As an introduction to my subject I will briefly mention some of our later notions as to the anatomy and physiology of the cerebellum. Edinger (1) who has studied this part of the brain from a phylogenetic point of view calls attention to the fact that the vermis first appears in the lower forms of animal life and that it is essentially the organ for what he calls the statotonus, that is the coördinated muscular tension stimulated by impulses originating in the labyrinth and in the muscles and joints. The cerebellar hemispheres which appear in

FIG. 1. Schematic representation of the principal cerebellar connections, modified after diagrams by Moritz and by Thomas. There are two main cerebellar systems:—

1. Cerebro-cerebellar system. This pathway of fibers interrupted by numerous neurones begins in the posterior columns of the cord, passes by way of the fillet to the thalamus, cerebral cortex, middle peduncle of the cerebellum, cerebellar cortex, dentate nucleus and superior peduncle to the motor tegmental nucleii—red nucleus, Deiters. From this point peripheral connections are made, one of these being the rubro-spinal tract. This system has for its function regulation of muscular movements such as is represented by the finer synergic movements of the extremities. The cerebellar connections to the motor cranial nerves are indicated by the tract from Deiters' nucleus to the posterior longitudinal bundle.

2. Cerebello-bulbo-spinal system. Stimuli from the spinal cord by way of the afferent cerebellar tracts, Gowers' tract, direct cerebellar tract, and from the vestibular apparatus by way of the vestibular nerve reach the vermis and from here are carried to the tegmental nucleii and then to the motor spinal tracts. The vestibular-spinal tract from Deiters' nucleus illustrates an important centrifugal spinal connection in this system which has to do with the equilibrium of the body.

The vestibular-ocular reflex follows the course: Labyrinth, vestibular nerve, Deiters' nucleus, posterior longitudinal bundle and oculo-motor nucleii.

FIG. I.
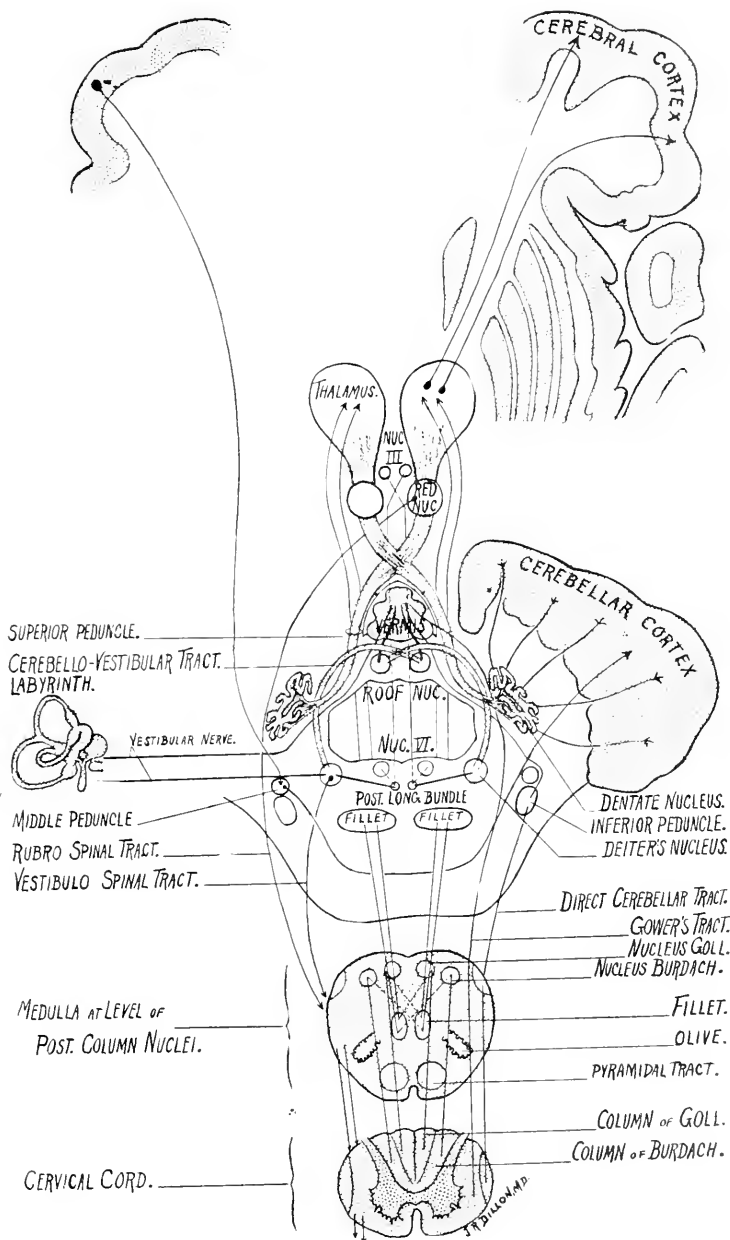
the higher forms have to do with the finer synergic movements of the extremities, the disturbance of which is shown by true ataxia. According to Edinger a peripheral stimulus originating for instance in the fibers of the posterior columns reaches the thalamus and finally the cerebral hemispheres. From here this stimulus is translated into a motor impulse by way of cortifugal fibers entering the pons and finally reaches the Purkinje cells in the cerebellar cortex. These principal pathways are illustrated in Fig. 1. Edinger therefore believes the cerebellum to be an organ regulating the muscular tonus. He quotes Sherrington in the experiment of separating the midbrain from the cerebellum by dividing the tecto-cerebellar tract and thereby producing decerebrate rigidity. This would indicate that the cerebellum constantly receives inhibition from the cerebrum.

Rothmann and Bárány, two noted authorities, have recently described centers in the cortex of the cerebellum. The latter speaks of tonus centers and would appear to incline towards Edinger's theory while Rothmann inclines to the view of definite cortical localization such as we have in the cerebral cortex, and by electrical stimulation claims to have produced muscular contractions in the corresponding members. His conclusions differ from those of Horsley, however, who has experimented previously along similar lines.

The title of this paper, " Cerebellar Syndrome," is rather comprehensive and it was chosen for the lack of a better one. I shall at times digress somewhat from my subject and speak of the pontine region and vestibular apparatus as anatomically and physiologically these structures are so closely related. The pathological processes producing cerebellar symptoms are very commonly new growths, abscesses and vascular lesions, more rarely atrophy and chronic degenerative and chronic inflammatory processes.

Cerebellar Ataxia

Cerebellar ataxia differs from the ordinary ataxia as seen in tabes, and presents distinguishing features which differ from other muscular incoördinations. The gait in cerebellar disease is characteristic—a staggering gait resembling that of a drunken person. In the Romberg test closure of the eyes does not affect the swaying as in tabes. In ordinary tests for ataxia of the extremities

such as the finger to nose test, the tabetic with the eyes closed cannot touch his nose because he does not know its exact location. Under the same conditions the individual with cerebellar disease knows exactly the location of his nose but cannot accurately coordinate his different movements and thus passes the mark. Thomas has named this symptom dysmetria. We have seen that the cerebellum is the organ which regulates the synergic movements of the muscles of the extremities. A disassociation of these synergic movements results in asynergia. This symptom is shown in Fig 2, in which the trunk does not coördinate its move-

Fig. 2. C. H. Male, aged 9 years. Diagnosis: Brain tumor. Asynergia of trunk and lower extremities.

ments with the movements of the legs: whereas the legs progress
in walking the body remains behind and projects backwards. As-
ynergia may also be brought out as follows: When the patient's
foot is raised to touch the examiner's hand held at a short distance
from the ground the thigh is flexed on the pelvis and afterwards
the leg on the thigh causing a complete disassociation of the move-
ment. Babinski (2) who described the above phenomenon also is
the discoverer of another very closely related to it: Adiadochok-
inesis or the inability to rapidly execute certain movements which
require the action of antagonistic muscles such as rapidly pronat-
ing and supinating the hands. The ataxia in cerebellar disease
when unilateral is as a rule on the same side as the lesion.

Falling Symptom

Starr before the International Medical Congress in London
last year called attention to sudden falling as an early sign of dis-
ease of this portion of the brain. A constant tendency to fall to
one side or another has been noted in the Romberg test. Bárány
(3) who assumes the presence of tonus centers in the cerebellum
believes that there are two such centers in either half of the vermis.
Either a destructive or an irritative lesion would then determine
the direction of the falling; and as an irritative lesion, such as
a tumor, is frequently in this region, falling to the side of the lesion
predominates. When falling is dependent upon a vestibular proc-
ess this falling is in certain definite relation to the direction of
the concomitant nystagmus, being in the direction of the slow
component of the nystagmus. When the position of the head is
changed, the direction of the falling is also changed to correspond
with the direction of the slow component of the nystagmus; for
example if with a slow component to the left the head be turned
at an angle of 90 degrees towards the right shoulder the patient
will fall forwards, but if the head be turned on the contrary at an
angle of 90 degrees towards the left shoulder the patient will fall
backwards. In cerebellar disease however there is no relation
between the direction of the nystagmus if present or produced
and the direction of the falling, nor does change of position of the
head change the direction of the falling. Such a condition would
speak in favor of a lesion of the vermis.

Symptoms Generally Associated With Increased Intracranial Pressure

Again there are certain symptoms which are most frequently caused by an increase of intracranial pressure and are not strictly speaking brain tumor symptoms. I refer to headache, nausea, vomiting, vertigo and choked discs. It is admitted that focal lesions may cause any or all of these symptoms but the immediate relief of the tension of the cerebrospinal fluid by decompressive operations by puncture of the corpus callosum or of the lateral ventricles will cause a corresponding amelioration of the above symptoms. Headache in posterior fossa tumor is frequently in the occipital region and not seldom accompanied by rigidity of the neck muscles. In the cases of posterior fossa tumor which we have observed and studied the above symptoms were all present. Bárány (4) states that nausea and vomiting are rare symptoms in this region. Oppenheim (5) states that here choked disc is not an early symptom.

In tumors of the fourth ventricle, particularly cysticercus of this cavity, there occur attacks of vertigo on abrupt movements of the head. This symptom brought out by Bruns is explained by the fact that the detached daughter cysts impinging on the walls of the mother cyst cause a stimulation of the vestibular
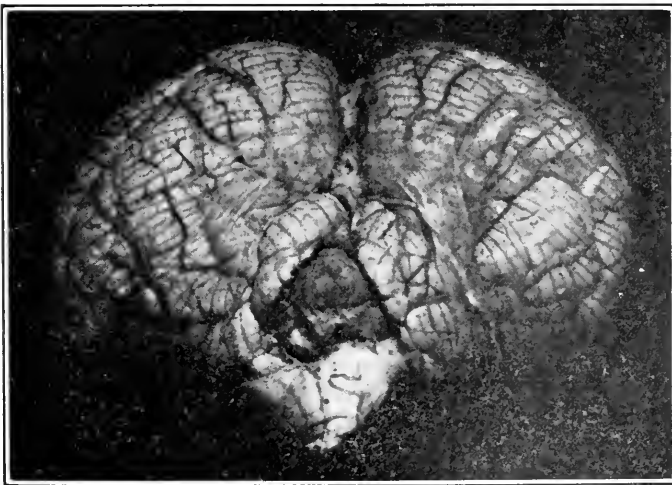
Fig. 3. A. D. B. Male, aged 20 years. Diagnosis: Angiosarcoma in the 4th ventricle. Probable origin tela choroidea inferior.

nucleus in the floor of the 4th ventricle. In the case here reported (Fig. 3) the tumor was an angiosarcoma probably originating from the inferior tela choroidea. The severe attacks of vertigo paroxysmal in nature were without doubt due to the direct pressure of this growth on the vestibular nucleus. Of the less usual symptoms of increased intracanial pressure we may have either unilateral or bilateral anosmia due to flattening out of the olfactory nerves at the base of the brain, or optic atrophy and changes in the pattern of the visual fields from pressure of the distended third ventricle on the optic chiasm. Here we may diverge a trifle to emphasize the importance of removing a condition. When increased pressure of the cerebrospinal fluid is present which may cause such a varied and confusing picture, callosal puncture as advised by Anton of Halle may be followed by gratifying results. This we have advised in several patients. In one patient lumbar puncture, which is attended with some risk in brain tumor, brought about improvement in a greatly impaired mentality, but was not repeated on account of alarming symptoms from the heart and respiratory systems.

Nystagmus

Nystagmus properly speaking is not a symptom of disturbed cerebellar function. The cerebellar apparatus is however in such close anatomical and psysiological relationship with the vestibular apparatus and the posterior longitudinal bundle and Deiters' nucleus that nystagmus is often spoken of as being a cerebellar symptom. We have observed a case (Fig. 4) of cerebellar softening involving the white matter of the hemispheres and the corpus dentatum in which there had been no evidence of nystagmus in the symptomatology of the case. The studies of Neumann and Bárány however have rendered the determination of nystagmus so important an aid to diagnosis of posterior fossa conditions that a brief discussion cannot be dispensed with. The pathway of the vestibulo-ocular reflex is diagrammatically outlined in Fig. 1, assuming that we are dealing with an intracranial nystagmus such as is distinguished by a quick and slow component, by persistence under closed lids and long duration and the absence of eye conditions which may be a cause. Firstly spontaneous nystagmus: When a spontaneous nystagmus exists the direction

of this nystagmus points towards the lesion when the latter is central, *i. e.,* retrolabyrinthine not peripheral. Neumann states that this is true in approximately 80 per cent. of all lesions. The
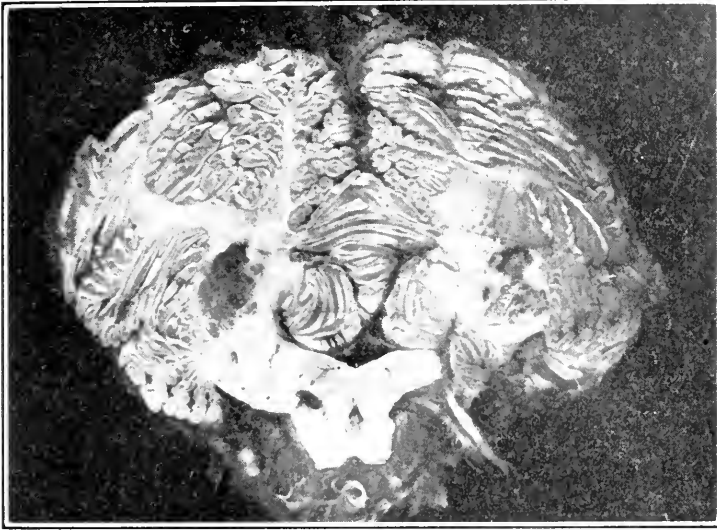
Fig. 4. J. E. S. Male, aged 57 years. Double-sided softening in white matter of cerebellar hemispheres.

vestibular nystagmus as has been mentioned consists of a slow and a quick component, the slow movement being the result of the labyrinthine stimulus and the quick component the compensatory action of the supranuclear centers. These latter were until lately supposed to be in the central cortex, but Bauer and Leidler, quoted by Marburg (6), in a series of experiments showed that removal of the cortex did not remove the quick component. The analysis of intracranial nystagmus now permits us to give a satisfactory explanation of the phenomenon of conjugate deviation of the eyes in cases of capsular hemorrhage. The inhibitions of the supranuclear centers being removed on one side by a lesion, the vestibulo-ocular reflex is given full play, resulting in the fixed lateral position of the eyes (Fig. 5). Neumann has described a case where there was inability to move the eyes laterally voluntarily but when the eyes were fixed by the finger this was rendered possible. If in this same case a nystagmus was produced by turning, a deviation conjugée was produced.

In pontine lesions Marburg (7) gives two causes for deviation conjugée, a cerebral and labyrinthine form: " Wir hätten
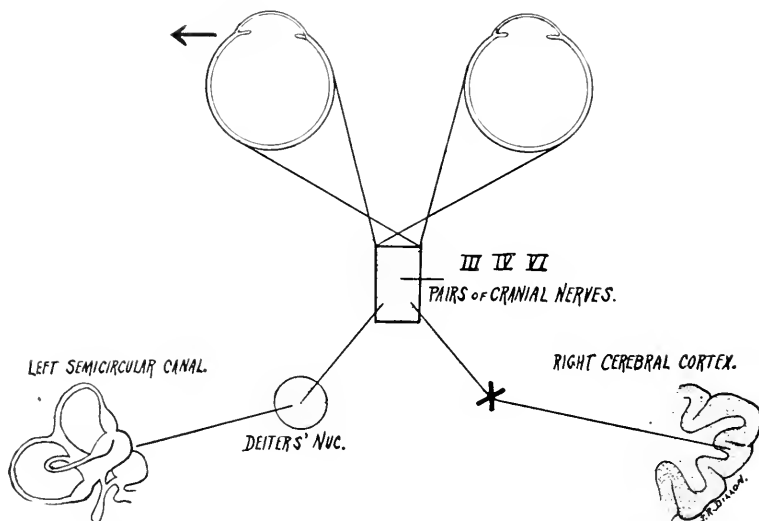
FIG. 5. Schematic Representation of Conjugate Deviation of Eyes. (X) Lesion in supranuclear center. Arrow indicates side towards which eyes deviate.

demnach bei pontinen Herden eine doppelte Ursache fur die Deviation conjugée: Die erste besteht in einer Läsion der Willkürbahnen, zerebrale, hemiplegische Form. Sie ist zumeist herdkontralateral mit gleichseitiger Hemiplegie verknüpft und dürfte ein Reizungssymptom darstellen; sie ist an Herde im Brückenfuss nahe seiner oralen Grenze gebunden, wenn diese ein wenig haubenwärts vordringen. Die zweite, die labyrinthäre oder vesttibuläre Form, findet sich bei Affektionen der Brückenhaube, wenn diese den Deitersschen Kern resp. dessen System lädieren. Sie scheinen herdgleichseitig und herdkontralateral, ganz im Sinne von Bruce als Reizungs- und Lähmungssympton auftreten zu können."

This brings us to the consideration of induced nystagmus such as may be produced by various means, by rotation, by the caloric test, by aspiration in fistula and by galvanism. A description of the physiology of these functional tests may be dispensed with and a brief mention made of a few aids to diagnosis whose worth appears to be established. When there is a question of whether

a spontaneous nystagmus is due to a lesion in the cerebellum or to a lesion in the peripheral vestibular apparatus the caloric test gives certain information (Neumann). From other symptoms the probable location of the lesion is determined and the ear on the opposite side to the lesion is syringed with cold water. If the vestibular apparatus is affected the nystagmus produced will last from 2 to 3 minutes, but if the lesion is central there will be an enduring nystagmus lasting from 8 to 9 minutes. As is well understood peripheral destruction of the vestibular apparatus or nerve will show an absence of reaction to the caloric test. In cases of cerebellar pontine angle tumor the caloric test is also absent; Bárány (8) states that in 30 cases observed by him this phenomenon has not varied.

After turning we sometimes get a certain violent reaction consisting of a prompt and marked nystagmus together with great dizziness, and falling. This has been found in tumors of the brain not involving the cerebellum, but is present on account of the probable removal of the inhibitory influence of the higher centers on the peripheral and central vestibular apparatus. This reaction is called the tumor reaction. In a recent case of a tumor involving the corpus callosum this reaction was marked (Fig. 6).

FIG. 6. K. A. Male, aged 47 years. Diagnosis: Sarcoma of tela choroidea superior involving corpus callosum.

Galvanic Tests.—Babinski has described a rotation of the head normally to the side of the anode when both positive and negative poles are placed a little above the tragus on either side and a varying current of from 1 to 10 ma. is allowed to pass through the head. This is said to be due to the electrical stimulation of the central vestibular apparatus. In case of a unilateral lesion Babinski holds that the head rotates or inclines toward the side of the lesion in man. This however has not been fully confirmed by animal experiments.

Ruttin has also employed galvanism in functional vestibular tests. To quote from an article by Dr. Harrington Graham (9): "If cold water is simultaneously run into both ears under similar conditions there should be no nystagmus. If one vestibular apparatus is less sensitive than the other there should be a nystagmus to that side. The same is true of the nerve in relation to the galvanic test. The kathode applied to both ears under like conditions should produce a nystagmus toward that side containing the more reactive nerve. Therefore, if we have a patient with vestibular symptoms, as spontaneous nystagmus or dizziness, or dizziness with forced head movements, and there is no nystagmus on applying the caloric test to both ears under like conditions, and there is a nystagmus on application of the galvanic test simultaneously to both ears, we can readily make a diagnosis of retrolabyrinth affection and determine the side that is over- or under-active. In the application of these tests one has to keep ever in mind the physiology of the vestibular tracts as in cases where the cerebellum is affected we may produce by the double caloric a nystagmus to the sound side instead of to the diseased, thus confusing our diagnosis; we must assume the presence of a tract (cerebellar) that acts as a brake on the normal impulses and when the brake is off that side will overact, producing a caloric nystagmus to the opposite side. This we see in cerebellar tumor, abscess, etc. It will be readily seen that we have in these cases of Ruttin's the means for quickly ascertaining whether either the vestibule and semicircular canals or the nerve on one side or the other is over or under sensitive or normal, thus wining one more point in our differential diagnosis."

Pointing Tests of Bárány

Graefe first found that in ocular paresis when a patient attempted to point to a cross on a black board with his eyes closed, he would point to one side. Neumann and Bondy discovered that when a patient was turned in a rotary chair that the objects of the external world appeared to him to be misplaced. Bárány deserves the credit of describing an objective test for the notion of position of external objects: After the vestibular apparatus has been stimulated a normal individual will point to one side of an object in space after such stimulation by various methods of turning, syringing, etc., and the direction of this error will be in the direction of the slow component of the nystagmus produced. For instance if cold water be injected into the right ear a nystagmus will be induced towards the left and pointing errors to the right. As the nystagmus varies so also will the pointing vary, and positions of the head will therefore determine the different directions of the pointing, in either the horizontal or vertical plane. These errors of pointing may be demonstrated by the extremities and also by the head; the errors are constant, irrespective of the position of the extremity, as for example there is no change if the arm be in pronation or supination. Adhering to the notion of tonus centers in the cerebellar cortex Bárány believes that there is a cerebellar localization of such centers for pointing. A lesion of the cerebellar cortex will produce anomalies of pointing which have a diagnostic significance. For instance if there be a destructive lesion in the arm center of the right cerebellar cortex the patient will no longer point to one side after turning but will point correctly. Spontaneous errors of pointing may also be present, but for Bárány the characteristic symptom of cerebellar cortical disease is the definite abnormal reaction of pointing after turning, or after the caloric tests.

Lesions of other portions of the brain may cause spontaneous errors of pointing by reaction at a distance or " Fernwirkung " (Bárány) (10), but in these cases the pointing after the above procedures is normal. Recently Rothmann (11) has published an interesting history of a man who, after a traumatism of the head followed by vertigo, nausea and papillary edema, not alone showed spontaneous but also induced errors in pointing. At the operation a subpial sero-sanguineous effusion was found over the

supramarginal gyrus. Following the operation this patient pointed
normally. In this patient there was no sensory or motor involve-
ment in the arms. Rothmann believes that this case speaks
strongly for a cortical localization to explain the abnormal point-
ing reactions. Recently we have observed a patient in the Stan-
ford Clinic who complained of nervous symptoms and who showed
a well-marked astereognosis of one hand with profound involve-
ment of the deep sensibility and very little of the superficial sen-
sibility in this extremity. This patient was tested for pointing
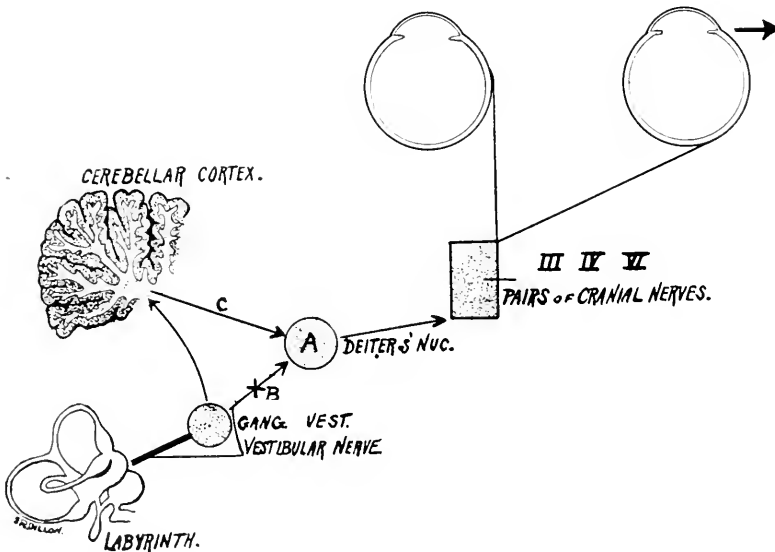
Fig. 7. Illustrating Labyrinthine Reactions after Syringing Left Ear
with Cold Water. Arrow indicates direction of resulting nystagmus. A
lesion in Deiters' nucleus (*A*) will block nystagmus and influence normal
pointing tests, *i. e.*, patient will point normally when he should deviate.
A lesion in the vestibular nerve (*B*) between the vestibular ganglion and
Deiters' nucleus will block nystagmus but will not influence normal point-
ing tests, *i. e.*, patient will deviate on pointing.

and on the affected side spontaneous as well as produced errors
were found on repeated tests in the neurological clinic and the ear
clinic. This patient presented no signs of cerebellar disease. The
inference is that in this case the pointing errors were due to a
cortical lesion. In the caloric test a comparison of the behavior
of the pointing and the nystagmus produced may give information
as to the localization of a lesion. For instance a lesion in Deiters'

nucleus will block nystagmus but will also influence pointing tests through the cerebello-vestibular tract. A lesion of the vestibular nerve between the vestibular ganglion and Deiters' nucleus will block nystagmus but will not influence the normal pointing tests on account of undisturbed cerebellar function. Diagram 7 illustrates these points.

OTHER SYMPTOMS OF CEREBELLAR DISEASE

Scanning speech, slowness of speech, fixed attitude of the head and trembling have been described as symptoms of cerebellar disease. As in tumors elswhere there is sometimes localized sensitiveness to percussion over the area of growth. A very interesting and curious symptom of cerebellar disease has been described by Babinski (2) and called by him cerebellar catalepsy. This was shown to perfection in our case of cerebellar softening previously mentioned (Fig. 4). This man who could not stand without support, could while reclining on his back hold both legs practically immovable above the trunk and free from the bed; indeed he could perform this maneuver as well if not better than the normal individual and without as much fatigue. Other symptoms referable to the lower extremities are not infrequently found in tumors of the posterior fossæ due perhaps again to increased intraspinous pressure and these are: Tetany of the muscles of the legs and radicular pain, and absence of the knee jerks. Contralateral pressure of a tumor on the pyramidal tract may, according to Oppenheim, give the Babinski sign.

SYMPTOMATOLOGY OF CEREBELLO-PONTINE ANGLE TUMOR

In tumor of the posterior fossa situated at the cerebello-pontine angle we often have a combination of symptoms readily explained on anatomical and physiological grounds. These symptoms are unilateral facial neuralgia, facial nerve paresis, corneal anesthesia, nerve deafness, absence of caloric reaction on the side of the lesion, together with some or all of the signs of intracranial pressure mentioned above. Abnormal pointing reactions have been noted in the upper extremity on the side of the tumor and are explained by pressure of the tumor on the arm center in the cerebellar hemisphere. In one case of cerebello-pontine angle tumor which was successfully removed by Dr. Emmet Rixford,

the first symptom was difficulty of hearing over the telephone in the left ear. This patient would often suffer from dizziness on getting out of bed. Failing eyesight finally brought the patient to the clinic and a marked papillary edema was found. The ear symptoms, corneal anesthesia and slight facial paresis made the diagnosis most probable, but in this case the labyrinth acted normally to the caloric test on repeated examination. This experience was in striking contrast to the absence of excitability of the labyrinth in Bárány's (8) cases.

Bárány's Symptom Complex

Bárány (12) has described a group of symptoms brought about by a circumscribed increase of fluid pressure in the cisterna pontis lateralis, at the cerebello-pontine angle, due to adhesions and consequent interference with the cerebrospinal fluid circulation. Otitis media, syphilis, rheumatism and influenza may cause this condition. The symptoms are difficulty in hearing, vertigo, ringing in the ears, occipital headache and pointing errors outward on the affected side. Variations in acuity of hearing are characteristic. Babinski (13) has previously recommended lumbar puncture and the withdrawal of a considerable amount of fluid for the relief of these symptoms. This procedure evidently acts by breaking up adhesions of the meninges. Bárány has practiced trephining over the mastoid process in several cases.

Summary

1. It is impossible to state that any one of the above described symptoms is absolutely dependable in cerebellar disease, therefore the classification cerebellar syndrome.

2. Of the more dependable symptoms we would class ataxia of cerebellar type, asynergia, adiadochokinesis and cerebellar catalepsy; falling symptom, and variations from the normal in the functional labyrinth tests and the pointing reactions of Bárány.

3. Less dependable symptoms are those produced by intracranial pressure: Nausea, vomiting, vertigo, choked discs and nystagmus.*

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AN ANGIOMA OF THE CEREBELLUM

By L. Newmark, M.D.

SAN FRANCISCO

The tumor which is illustrated here by the photograph of a section stained according to the method of Van Gieson is an object of some interest because its effect, which was fatal, seemed out of proportion to its size, which was very small, and still more because its histological examination showed it to be of a kind very rarely met with in the cerebellum, where it was found. An inquiry into the literature of the subject furnished a moderate number of reports of cases of circumscribed angioma in the cerebral hemispheres, several of the writers remarking upon the infrequency of such an occurrence. But of a circumscribed angioma of the cerebellum only what looks like a solitary instance was found recorded in a brief abstract of a Russian article, where it is stated that a "hemangioma in the cerebellum" was successfully removed from a girl nine years old.[1]

The patient from whom my specimen was obtained was a woman, aged 32 years. About a year and a half before coming under my observation she had had a first attack of pain in the back of the head, which lasted for a short time only. A month later she suffered again in the same way for a few days; and two months after the second attack a third, severe, one occurred. Vomiting did not accompany these headaches. There followed a period of ease which continued until six weeks before I first saw her. Then the occipital headaches recurred: intermittent at first, but persistent for the past month, and, when severe, attended with vomiting and with diplopia. She had taken to her bed three weeks before I became acquainted with her. She is said to have complained of dizziness, but no statement was obtained indicating a disturbance like cerebellar staggering. Buzzing in the left ear was mentioned as having occurred at one time. Of late she would have attacks in which consciousness seemed to be obscured, she could not speak, would perspire freely and turn yellowish. Such attacks would last a few minutes and would be followed by vomiting. In the course of her six weeks' sickness she had been sub-

[1] Journal of the American Medical Association, May 9, 1914.

jected to treatment with iodide of potash, mercury and finally salvarsan.

The patient suffered in the manner described during the week she was under our observation: there were occipital headaches, attacks of altered consciousness and vomiting. She was very emaciated. The optic discs were only very slightly blurred; in fact I was not sure of this and had an oculist examine her repeatedly; he never could convince himself that there was any choking of the disc and considered what he did see as rather indicating a toxic neuroretinitis. There was nystagmus on looking to either side, rather more marked on looking to the right, but none on looking upward or downward. The pupils reacted well to light. The hearing was unaffected; but on account of her frequent vomiting and her apparent prostration Bárány's caloric tests were not made. There were no disturbances of sensibility anywhere until the last day of her life, when it was noted that the sensibility of the right cornea was dulled and from the left no reflex at all was obtained. The cranial nerves were not otherwise affected, nor was the deglutition impaired. The headaches were not felt more in one half of the occiput than in the other, radiographs disclosed nothing abnormal, and careful and repeated testing of the skull elicted no tenderness to percussion or pressure anywhere, the back of the head being most diligently examined in this respect. There was no ataxia of the extremities, no adiadochokinesis, no astereognosis. She seemed too feeble to be taken from her bed and tested as to her gait, but on the morning of the day on which she died she surprised us by the ease and vigor with which she rose from the recumbent into the sitting posture.

The knee-jerks as well as the reflexes of the upper extremities were constantly absent, while the Achilles reflexes could at all times be easily elicited.

On the afternoon of December 10, 1913, the husband had just assented to the proposal to explore the cerebellum when word came from the hospital that the patient was worse, and she soon passed away.

The contents of the cranial cavity having been removed a limited, cyst-like, collection of fluid in the pia-arachnoid drew attention to its site at about the middle of the posterior margin of the left cerebellar hemisphere. A horizontal incision into the cerebellum at this place revealed a dark-red spherical tumor, about the size of a pea. The incision had left the globule intact: part of the little sphere was free, and part seemed embedded in the surrounding tissue. The tumor did not quite reach the surface of the cerebellum, but was a few millimeters beneath it.

The whole tumor with adjacent tissue was excised in one small block. Sections were submitted to Professor Ophüls, the pathologist of Stanford University, who, with accustomed generosity, examined them and sent the following report: " Small tumor of

the cerebellum, about five mm. in largest diameter. The tumor is made up almost altogether of capillary bloodvessels of various sizes. Some of them are narrow and cylindrical, others very large and sinuous. Many of the cylindrical capillaries are in a state of collapse. Little, fairly cellular, loosely constructed fibrous tissue between the bloodvessels. The tumor is intimately connected with the pia mater, well circumscribed. It has caused some destruction in adjoining cerebellar tissue by pressure, but does not extend into brain tissue proper. Angioma of the cerebellum."
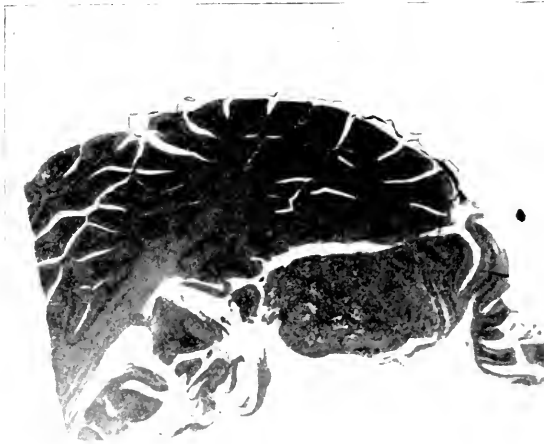
Fig. 1

To this may be added that no hemorrhages had occurred in or around the tumor; nor were thromboses or calcified vessels seen. In the center of the sections the vessels are seen to occupy the field more exclusively than at the periphery, where there is more tissue between them, so that one gets the impression of a cavernous structure. But there are not the large spaces filled with blood and separated by walls of connective tissue and lined with endothelium, which constitute the cavernous angioma.

There was no considerable degree of hydrocephalus. Macroscopic and microscopic sections from other parts of great and small brain showed no further lesion. In sections of the meninges, where the fluid had collected, nothing more abnormal was noticed than a slight widening of the space between their layers.

The autopsy could not be extended beyond the skull.

The antecedent occipital headaches of more than a year before may be regarded as premonitory. In the final phase of seven weeks' duration the course did not seem to differ much from what is observed in cases of less uncommon tumor. However, considering the severity and frequency of the headaches and the vomiting and the attacks of altered consciousness together with the loss of knee-jerks which seemed attributable to increased pressure in the cerebro-spinal canal one would have expected more swelling of the optic discs. It was on account of the assumption of a tumor in the posterior fossa with much pressure that we forbore to practise the lumbar puncture, fearing the consequences under such conditions.

Had the operation been performed it is not improbable that the collection of fluid at the site of the angioma would have made the impression of a circumscribed serous meningitis and that the operation would have concluded with the evacuation of the fluid, and the little tumor have been overlooked and allowed to remain. But even from so limited an intervention benefit might have ensued, for the local accumulation of fluid may have been the immediate cause of the suffering and death rather than the tumor itself.

Lacking reports of other cases of tumor of like structure in the cerebellum I can only cite for comparison accounts of circumscribed angiomas which have been observed in the cerebral hemispheres, disregarding the diffuse teleangiectatic tumors of the pia mater. Oliver and Williams[2] reported the removal of a " simple angioma, rather a rare form of growth apart from sarcoma." There was optic neuritis together with the other common signs of a cerebral tumor. In four other cases, of which two have been described by Astwazaturoff,[3] one by Struppler[4] and one by W. J. Sweasy Powers,[5] the tumors were cavernous angiomas, three of them situated superficially and connected apparently with the pia, while the fourth, that described by Powers, was well down in the centrum ovale of the frontal lobe and not connected with the pia mater. In none of these is it clear that choked disc was present; in none was a tumor diagnosed. Epileptiform convulsions were

[2] British Medical Journal, 1898, Vol. 26, p. 1267.
[3] Frankfurter Zeitschrift für Pathologie, Bd. 4, and Monatsschrift für Psychiatrie und Neurologie, Vol. 29.
[4] Münchener. med. Wochenschrift, 1900, p. 1267.
[5] Zeitschrift für die gesamte Neurologie, 1913, Vol. 16, p. 487.

common to all of them. All the patients were women. Of these
Struppler's patient interests us particularly on account of the di-
minutiveness of the fatal angioma. It is described as being " some-
what larger than a pea," and "hardly the size of a small hazel-
nut." It was situated at the upper end of the Rolandic region,
accordingly remote from respiratory and cardiac centers, differing
in this respect from a cerebellar growth. Yet the patient, who
had been considered well only a few days before, died after a
numerous series of convulsions which had begun locally and later
became general. The author was struck, like myself, by the appar-
ent disparity between cause and effect.

From the history of the occurrence of headaches in my patient
about a year and a half before the final stage of the disease it may
be inferred that the tumor was at least of that long standing; and
from its smallness after the lapse of such a period it may be in-
ferred that it had very little, if any, tendency to grow, and that it
was capable of producing its evil effects only by congestion,
edema or hemorrhage.

Perhaps the angioma was congenital. In connection with this
suggestion reference may be made to an interesting article by
Oppenheim,* who has seen a number of cases following a peculiar
course which he is inclined to ascribe to a congenital " Kavernom "
in the brain. A " cavernoma " in the sense in which the term is
used by Oppenheim would seem to include all varieties of hem-
angioma. The coexistence of an angioma of the skin in the
patient, or even in a parent of the patient, is held to afford sup-
port to the diagnosis. Oppenheim quotes von Bergmann as stat-
ing that the " Kavernom " is rare, but he himself thinks that the
angioma cerebri cannot be such a rare tumor if the conception of
it be broad enough, and that it has surely generally eluded clinical,
and perhaps often escaped anatomical, diagnosis. I had not Op-
penheim's article in mind while observing the patient, and some
little angioma of the skin may not have been observed. I can
only say that none was conspicuous. Oppenheim considers it re-
markable that in nearly all his cases the patients were males. It
appears equally remarkable that in mine and in all the others I
have adduced the patients were females.

* Ueber klinische Eigentümlichkeiten kongenitaler Hirngeschwülste.
Neurologisches Centralblatt, 1913, No. 1

Society Proceedings

NEW YORK NEUROLOGICAL SOCIETY

January 5, 1915

The President, Dr. Smith Ely Jelliffe, in the Chair

A CASE OF EPILEPSY, COMPLICATED BY A TRAUMATIC NEUROSIS

By William Steinach, M.D.

The patient had presented himself at the neurological clinic of the University, with a letter from his family physician, asking that a skiagram be taken and suggesting the possibility of operative intervention. He was an assistant shipping clerk, twenty-two years of age, single; born in the United States of Irish parents, the eldest of seven children, one of whom died in infancy. All the living children, except the patient, were healthy.

Family History.—Practically negative. A maternal grandmother died of apoplexy; a sister, of spinal meningitis at the age of six months. The father died of pulmonary tuberculosis; a paternal aunt, of dropsy.

Previous History.—The patient was born after a difficult labor of fifteen hours' duration, with instrumental intervention. He was brought up on prepared foods. A slight backwardness in learning to talk and walk, and a tendency to stammer while learning to speak, were the only unusual features of his infancy. A severe attack of cholera infantum, which lasted two months, during his first year, and mild attacks of the usual diseases of childhood were his only illnesses before the beginning of the present trouble.

History of Present Trouble.—When ten years old the patient was hit on the head with a baseball bat over the left temple. The wound bled profusely, but the patient did not lose consciousness.

Two years after the injury the patient had the first convulsion. He was found in bed by his mother, jerking violently. During the convulsion, which was general in character, he passed his water and lost consciousness completely. Fifteen minutes later he had regained consciousness and was able to go to school. For four months he received treatment at the Presbyterian Hospital, and in that time had no attacks. When the treatment was discontinued, however, the same trouble returned.

The attacks, of grand mal type, were described as occurring chiefly at night. In the course of them the patient would bite his tongue and void urine. At times he would vomit immediately afterward. The attacks recurred at intervals of from three to six months. There had been, however, as many as three in one day. There were no attacks of petit mal.

Two years ago the patient was struck on the top of the head while coming out of an elevator in a bank. The accident was rather trivial,

and did not affect the patient until there was some talk of a suit against the bank, which was subsequently settled. Since that time, the patient began to have peculiar attacks, in addition to the previously described type, in which his left leg was drawn up and adducted, and his left hand flexed. These attacks were not accompanied by loss of consciousness. They became very frequent,—sometimes as many as five or six in one day, each lasting about two minutes. Dr. Steinach stated that he witnessed one of them, and that the convulsion was clonic in character, involving the left leg and hand, with the back arched in a typically opisthotonos fashion.

Physical examination showed the left pupil a trifle larger than the right; both responded to light and accommodation. There was no abnormality of the motility or fields of the eyes. The left knee jerk was a trifle more active than the right. No clonus; no Romberg; no ataxia. No sensory disturbance; no astereognosis; no asynergism.

The question in connection with this case, Dr. Steinach stated, was whether this was a case of Jacksonian epilepsy in which the convulsions were attributable to *a right sided lesion from* contre-coup, or a case of epilepsy upon which were engrafted hysteroid attacks as an expression of a traumatic neurosis.

In a recent number of the Journal of the American Medical Association Dr. Burr reported a case of multiple neuritis complicated with hysteria, and Dr. Steinach had thought the case presented of sufficient interest to be reported, in that it might be considered a case of epilepsy, complicated by a traumatic neurosis.

Furthermore, the psychogenesis of the traumatic neurosis superadded to the epilepsy was very *distinctly* illustrated. The underlying unstable neurotic disposition accompanying the epilepsy was a ready soil for the neurosis. During the ten years his major attacks had lasted, he was repeatedly questioned by the various physicians whom he consulted, about blows to the head, as being a possible cause for his epilepsy. When he did receive the blow on the head, the repeated questioning having suggested the causal relationship to convulsive attacks, they promptly appeared in the left arm and leg, showing their purely hysterical character.

A CASE OF PERIODIC PARALYSIS

By C. E. Atwood, M.D.

The case, Dr. Atwood explained, was presented on account of its extreme rarity. Fewer than a hundred cases had thus far been recorded. A careful study of the disease were first made by Westphal in 1885, and later Goldflam gave a full description of it. The text-books scarcely mention the disease.

The patent was the tenth case in a family whose history was studied for four generations. The cases were all on the maternal side, and all were born in Russian Poland.

The patient was twenty-one years of age, and the second of three children, all males. One brother and the mother were affected by the same disease, and had also been examined by Dr. Atwood. The next nearest relative was a maternal uncle. Most of the other cases were cousins, once or twice removed. One second cousin choked to death dur-

ing an attack. He had been left alone and was unable to turn his head in order to throw off some food which had regurgitated. Another second cousin, who was subject to the disease, while serving in the Russian army had a severe attack, and died from burns inflicted on him during it because he was thought to be malingering.

The medical history of the case presented, aside from the attacks of periodic paralysis, was negative. The patient was well-built, muscular, with massive quadriceps. There was no dystrophy although an associated dystrophy had been found to occur in a few of the cases on record. There were no evidences of local wasting, or local paralysis. Examination between attacks showed that sensations to touch, temperature, pain and pressure were present. The reflexes were present and normal; the cranial nerves were normal; the fundus oculi was normal; the heart and lungs, normal. There was no spasticity or flaccidity of muscle. The electric reactions were present. There were no hysterical stigmata. In all respects, physically and mentally, the patient seemed normal. His history, however, showed that he was subject to attacks of motor paralysis at intervals of a few days to a few weeks, lasting for a few hours to two or three days.

Dr. Atwood stated that he had seen the patient and examined him during three of these attacks. The first one which the patient ever had occurred when he was four years of age. It lasted twenty-four hours and was general. The second attack was at the age of twelve, and lasted twenty-four hours; also general. The third attack occurred at fourteen and was typical and severe, and was followed by milder attacks as often as once a week, or even daily. Since the age of fourteen his severe attacks have occurred, at first, one in two or three weeks; later on, once in two months; and, under treatment since 1911, have recurred at longer intervals, until lately they have increased in frequency. They are more frequent in cold weather. They are sometimes preceded by a heavy feeling in the legs, which then enables the patient to foretell an attack. Attacks usually came on at night.

The first one witnessed by Dr. Atwood was on November 14, 1911, twelve hours after its inception. It was not a very severe one, and may have been lessened in severity by magnesia citrate and an enema. The patient was entirely conscious, and no abnormal mental symptoms were noticed. The left side was more affected than the right. There was great flaccidity. The patient felt weak in the ankles, knees and wrists. He was able to get out of bed with assistance at the time of the visit, but felt weak, dizzy and faint while in the erect posture, and could not stand unsupported. Sensation to touch, temperature, pain and pressure was everywhere preserved. Muscle irritability was diminished on the less affected and absent on the more affected side. The cranial nerves were free. The left knee jerks could not be elicited; the right was barely present. The left plantar reflex was absent; the right normal. A bruit could be distinctly heard over the apex of the heart. This bruit was not present when the patient was examined between attacks. The apex beat was at the sixth intercostal space. The attack lasted twenty hours. The next day on examination both knee jerks were present and there was complete restoration in muscle function and reactions. The mitral bruit had disappeared, but the apex beat remained in the sixth intercostal space.

On December 7, 1911, an examination of the patient was made during an attack, fourteen and one half hours after it began. The patient could talk, but was otherwise almost completely paralyzed. He had eaten heart-

ily just before retiring, and had smoked more than usual. Also, the evening before, his legs had seemed weak in walking, and he could not extend the fingers of the left hand. It is possible that these symptoms may have indicated a slight attack at that time. He went to sleep as usual, however, but awoke at two a. m., unable to move the arms and hands and right leg, but could move the left leg and foot slightly. He was able to sleep again, but awoke at three a. m. and found that he could move only his head. On examination at 4:30 p. m. recovery had begun. He could move the great toes, and flex the fingers; could slightly roll the head from side to side, and slightly move the left leg and the right forearm. His paralysis was flaccid. The knee jerks were absent; ankle jerks barely present; abdominal and cremasteric reflexes present, slight. The heart showed a mitral bruit. The breathing was shallower than normal and carried on mostly by the diaphragm. The voice was fairly strong; the cranial nerves were free; there was an absence of muscle tone; no responses to direct tapping. All sensibility was unimpaired; the mind was unaffected; the mucous membranes appeared normal; the hands and feet were warm; the patient was able to swallow a glass of milk and retain it. Improvement continued from the periphery upward,—the wrists, elbows, shoulders and ankles improved during a period of about two hours. The condition returned, however, at midnight after the examination, and the patient became again paralyzed, except in the fingers and neck. He vomited at eleven p. m. the milk taken, and voided urine. He was unable to expel two enemata of soapsuds administered during the attack. The following morning he awoke at six a. m., entirely free from symptoms.

Urinalysis during attack showed increased acidity; increased indican; little albumin; increased sulphate partition. Bacteriological study of the feces showed a marked intestinal infection and a state of fermento-putrefaction, due to a clean-cut infection of the Bacillus aerogenes capsulatus. The same condition was found in the mother and brother in a lesser degree, and was present very slightly in the father, who was not affected.

Dr. L. Pierce Clark said that he would like to ask Dr. Atwood if he had found out whether there were times when after indulging in these various irregularities of diet the patients did not have attacks in consequence, and also if experiments had been made at different times with a view to suggesting a suitable diet and finding out just how susceptible the patients were to these changes.

Dr. Atwood, in reply to Dr. Clark's question, stated that he had not been able to handle the case closely enough to do work along such lines; the conditions surrounding the patient could not be controlled to this extent. John Mitchell, Edsall and Flexner carried out a series of such experiments some years ago, and found diminished kreatinin excretion.

There have been but few autopsies and no histological studies after death. Findings based on the urine, feces and blood are conflicting. There has been no examination of the spinal fluid, as yet, during an attack. Determining causes of individual attacks have been ascribed to muscular exertion, indiscretions in diet, exposure to cold, constipation, nervous and mental fatigue, worry and emotional excitement, etc. There is a general consensus of opinion, however, that as regards the pathogenesis of attacks a condition of auto-intoxication is present. Nearly all the various other theories are found untenable. There seems to be a

deficiency of elimination of nitrogenous metabolic products, and the absorption of some toxic substance, perhaps from the gastro-intestinal tract, which is capable of acting as a paralyzant to both the endings of the peripheral motor nerves and to the muscle-fibers themselves.

A MULTIPLE SCLEROSIS IN MOTHER AND SON

By I. Abrahamson, M.D.

Before presenting the patients, Dr. Abrahamson read a short account which the son had written of his own case, and which gave evidence of the unimpaired intelligence of the patient.

The son, a student, twenty years of age, was born in England. His earliest recollection of the trouble, he stated, dated back to four years ago, when there began to be a numbness in the limbs; weakness in the legs; tremor of the hands, together with an inabilty to hold objects. There were no urinary symptoms with this first attack. The trouble continued for two weeks before the patient recovered.

The recent exacerbation came on three and a half months ago, when the patient began to have difficulty in starting the stream of urine, though no urgency. Also, he was troubled with obstinate constipation. About six weeks before, on his return from the country, where he had been able to do hard work, and had had a record of walking ten miles daily, he began to notice a weakness in the right leg, which increased until he was compelled to drag it after him as he walked, and for a week's time he was unable to bend it at all. Shortly afterward his right hand became so weak that he was unable to write. There was no tremor no paresthesia, nor headaches.

It was after the second attack that the patient was examined at Mt. Sinai Hospital. The following are the findings:

Pupils normal, nystagmus to the left; bitemporal pallor of the discs; jaw jerk lively; lower abdominal and right cremasteric reflexes absent; upper abdominal reflexes diminished; all tendon reflexes lively; ankle clonus present; bilateral Babinski; fine tremor of the hands; head tremor; Romberg; spastic ataxic gait, with a tendency to go to the right. Wassermann negative; cerebro-spinal fluid negative. Increased blood pressure.

The patient left Mt. Sinai Hospital improved, but recently had another slight attack. The viscera were normal, there were no abnormalities of emotional control, no real intention tremor, no pigmentation.

The findings, together with the history of remissions and exacerbations, fully justified the diagnosis of multiple sclerosis.

The mother was Russian, and had lived for a time in England. She was 48; had eight living children, and had had no miscarriages. With the exception of the one son, all the children were healthy.

Up to her twenty-second year the patient had been very erotic; after her marriage at that age she became frigid. Three months after her marriage, following a mental strain, there came the first indications of the disease, in the form of weakness and paresthesia in the hands. The sensation of touch remained for a long time after discarding an object. When she had dropped a key to the floor, she seemed still to feel it in her fingers; even after voluntarily laying aside a thing she would have in her hand the persistent sense of still touching the object she had put aside. In

walking the soles of her feet felt as though they were treading upon a soft, yielding surface, like a pillow; the gait was unsteady and reeling, and standing was difficult. There were no pains; voice and swallowing were normal. After a gradual increase of symptoms for four weeks, followed by six weeks' treatment by electricity at the London Hospital, she recovered sufficiently to return home.

Immediately upon her return she found that the house had been robbed, and the shock caused a return of the previous symptoms, together with diplopia and flaccidity of the legs. At the National Hospital, where she was treated during this attack, Dr. Bastian was said to have diagnosed the case as weakness in the legs, due to worry. After this attack she made apparently a complete recovery, and was entirely well for years.

Ten years ago, after the death of her father, there was a third attack, with a return of the weakness in the legs and unsteady gait, which lasted two months before the patient recovered.

Her recent exacerbation came on a year ago, and during this time the former symptoms returned with steadily increasing force. The gait again grew difficult and unsteady, the lower extremities weak, with a twitching of muscles of the leg, and a stiff feeling below the knees. There was imperative urination. The singing voice was lost. During this, as well as the other attacks, there was no loss of emotional control.

Her status, on examination at Mt. Sinai Hospital, November 22, 1914, presented unmistakable characteristics of multiple sclerosis.

Eyes: Small; pupils have a sluggish light reaction; nystagmoid movements in extreme positions; bitemporal pallor of the discs. Reflexes: Oppenheim; Romberg; bilateral Babinski present; absent abdominal. Tendon: U. E. diminished, lower present. Motor control: Spastic face; ataxic gait; hypotonia; slight unsteadiness in left hand at times; marked unsteadiness in the legs. Heart: Systolic apical murmur. Viscera: normal. Wassermann and spinal fluid: negative. Also a case of multiple sclerosis.

ETHICAL ASPECTS OF PSYCHOANALYSIS

By John T. MacCurdy, M.D.

(By invitation)

Psychoanalysis is a method of psychological investigation and therapy, which with its theory stands in a peculiar position to-day, inasmuch as both its opponents and its adherents show a spirit in their attacks or defense, so strong as really to be inconsistent with dispassionate scientific argument. There must be something in it, therefore, which stirs an emotional response. What this is may be inferred from the fact that the ranks of psychoanalysts have recently been split on that very rock which is the target for the abuse of the opponents. This is the claim that unconscious sexual motives, particularly of abnormal cravings, are basic dynamic mental factors. The claim that a mental cause may produce disease meets naturally with opposition from those who are convinced that there must be a physical abnormality in the brain corresponding specifically with every mental symptom. But equally bitter attacks come from those who are open to a belief in psychogenesis. The crux of the situation is therefore in the nature of psychoanalytic claims.

It is necessary to examine these claims from two standpoints—that of objective validity, and that of their ethical value or potentiality for good and evil. The evidence in favor of the truth of the teachings of psychoanalysis rested originally on the method of free-association. As this method implies a familiarity on the part of the physician with his technic such as is only gained by experience, and as the patient to coöperate must have established a certain *rapport* with the analyzer, it is difficult to demonstrate *objectively* that no suggestion is at work. It has been found, however, that the history of myths and folk-lore shows a development of ideas identical with those which Freud claimed to find in the unconscious of the neurotic individual. This would seem to offer strong support of his theory. But more recent work with the psychoses has shown that there is no "complex" reported by Freud which does not reach open expression in the psychoses under conditions which preclude suggestion. Moreover, the relation of these normally unconscious ideas is so regular that it is now often possible to predict the delusions or hallucinations to arise in a psychosis, knowing once the make-up of the patient and the precipitating cause of his break-down, although there may seem to be no surface relation between these factors whatever. This is such a flawless objective proof, as it reduced the problem to experimental conditions, that no psychiatrist can now be scientifically honest and deny the substance of these claims.

It is important, however, to examine the ethical aspects of psychoanalysis, for if the matter concerned be morally repulsive, anyone may be pardoned for paying no attention to it. That psychoanalytic claims are often regarded as being repulsive is certain. How has this come about? It is probably owing to two misconceptions: that what is unconscious is to be judged by the same standards as what is conscious; and that a symbolic outlet to a forbidden wish is as reprehensible as a direct fulfilment of such a wish. It is, however, obvious that if any idea be unconscious it can have no relation to reality. If not in contact with reality it cannot lead to any overt act. Immorality implied an act or at least the thought of some act; but an unconscious idea cannot be spoken of as immoral or even dangerous, so long as it remains in the unconscious. If the history of these wishes be followed, they are found never to have been in contact with reality, never fully conscious. This may be seen in the growth of the unconscious wish for incestuous outlet with a parent. The child loves his parent and naturally strives for expression of his affection. As soon as sex consciousness begins to develop, it is inevitable that the idea of physical outlet with those he most loves should appear. In so far as this outlet is frankly sexual, however, it is repressed into the unconscious. That the wish exists in the unconscious only is therefore a tribute to the morality of the individual. When these wishes do get into consciousness, it is only by symbolic expression. These symbols are symptoms, or sublimations. In both cases there is a distortion which makes the final concept perfectly acceptable to the moral side of the subject, except in such unusual cases as the kleptomaniacs. Sublimations are more than mere distortions; they are outlets which are socially useful. The individual in this case then uses the energy of his forbidden wish to benefit mankind. In demonstrating this, psychoanalysis pays a tribute to the morality of mankind rather than debases it. Both repression and sublimation demonstrate an ethical power in human beings, previously unguessed.

Dr. August Hoch said that he thought all must have been impressed

with the atmosphere created by this paper of Dr. MacCurdy's, an atmosphere different from that which the opponents of psychoanalysis have been accustomed to associating with the subject, for to them it was a subject in which nothing else but sexuality was dealt with, more particularly sexuality as they conceived it. Such an exposition of psychoanalysis as Dr. MacCurdy had just given should go far toward correcting such an impression. The psychiatrist had of course long been impressed with the frequency with which sexual motives were found in the psychoses, and therefore it was not surprising that a similar state of affairs should be found in the closely related neuroses. He thought that the most fundamental part of Freud's teachings, namely, that of the importance of the imperfect development of the love instinct, was proved by studies in the field of neuroses and psychoses; but he felt that Dr. MacCurdy had done a distinct service toward a better understanding of psychoanalysis by laying stress, not only on the more individualistic side of our instinctive life, but on the social side as well, i. e., the moral, adaptive forces which represented not only the ethical aspects of psychoanalysis but of the neuroses and psychoses as well.

Dr. Steinach asked Dr. MacCurdy how he could explain the Abderhalden reaction which recent investigators have shown to be fairly constant in dementia præcox, if the disease were of purely psychogenetic origin as he seemed to indicate in his paper.

Dementia præcox seemed to the speaker more like a chronic intoxication due to perverted metabolism and probably resulting from disarrangement of some of the internal glandular secretions.

With equal propriety one might make a psychoanalysis of any intoxication such as alcoholism or the delirium of typhoid fever, but the conclusions arrived at would in no respect help to solve the question of the origin of the condition.

Dr. Clark said apropos of critical remarks made concerning the much vexed question of the pathogenesis of dementia præcox, while it must be recognized that in certain mental diseases there are metabolic changes, yet this fact does not necessarily make observations of its manifestations of no value in the effort to gain some clue to its primary causes. Allowing the position of Dr. Steinach its full force, what had he to say with reference to the undeniable similarity of mental trends in organic nervous diseases and those psychopathic conditions where there is no manifest organic change? Where like physical causes were not operating to produce like effects, certainly it seemed reasonable to explain similar trends as due to some related underlying cause of a different nature, which the Freudian theory does by attributing both types of mental disorders to defective adaptation of primary instinctive trends to adult purposes in life.

Dr. Smith Ely Jelliffe said that he had nothing to add to Dr. MacCurdy's paper, except that it seemed to him to set forth what might be called the trend of modern opinion regarding psychopathic cases and that it was of value to have had a presentation of the subject which, as Dr. Clark and Dr. Hoch had just said, should go far toward creating in the minds of those hearing it a clearer conception of certain commonly misunderstood phases of the subject.

Freud explains very distinctly that neuropathic disorders have their rise in the reluctance of the subject to recognize certain vital situations which offend the moral side of his nature; rather than consider the possi-

bility of taking any step downward in his ethical attitude toward certain social reactions, the patient is ready to suffer martyrdom.

To brush aside an explanation of such conditions by such a sweeping objection as, " But these are abnormalities," reminded the speaker that in a celebrated dialogue of Protagoras a similar attitude was most strikingly disposed of. It might bear repetition at this late date since one hears it repeated so frequently in discussions of a so-called logical type. Here Protagoras called the attention of Morosophus, his adversary, to " Xenias the son of Glaucus," asking Morosophus if he knew him.

Morosophus: Yes, but he seemed to me a very *ordinary* man and quite unfit to aid in such inquiries.

Protagoras: To me he seemed quite wonderful and a great proof of the truth I have maintained. For the wretch was actually unable to distinguish red from green, the color of the grass from that of blood! You may imagine how he dressed, and how his taste was derided. But it was his eye, and not his taste, that was at fault. I questioned him closely and am sure he could not help it. He simply saw colors differently. How and why I was not able to make out. But it was from his case and others like it, but less startling, that I learned that truth and reality are to each man what appears to him. For the differences, I am sure, exist, even though they are not noticed unless they are very great and inconvenient.

Morosphus: But surely Xanthias was diseased, and his judgments about colors are of no more importance than those of a madman.

Protagoras: You do not get rid of the difficulty by calling it madness and disease. And how would you define the essential nature of madness and disease?

Morosphus: I am sure I do not know. You should ask Asklepios.

To which Protagoras remarks: " Ah! he is one of those gods I have never been able to meet."

Dr. MacCurdy, after expressing his appreciation of the cordial reception which his paper had met, said the fact that it had not given rise to more discussion by those holding contrary beliefs was to him a disappointment, since he felt sure that a talk extending over some fifteen minutes' time could scarcely have done a great deal toward changing views; he regretted that there had not been more adverse discussion of his paper, particularly since he had grouped the points made therein in such a fashion as to make it possible to take them up one at the time, with the idea of making them the starting point rather than the close of discussion.

Referring to Dr. Steinach's question, Dr. MacCurdy said that he presumed Dr. Steinach used the Abderhalden reaction as a specific example of a toxic influence which might be the causative factor in dementia præcox. That organic factors were important in dementia præcox is not only admitted by psychoanalysts, he claimed, but psychoanalysis furnishes a most definite proof of the existence of such factors. If normal, neurotic and psychotic individuals all had identical unconscious " complexes," then the difference these different types of individuals show in meeting certain situations common to them all could only be explained by the dementia præcox individuals' having from the outset an inelasticity and a defective adaptation, which must be founded on a physical basis. Any more specific statement of the relation between insane ideas and diseased cortex was impossible. The origin of definite ideas could only be traced by psychological means; a physical correlation implied a knowledge of what the

mechanical or chemical properties of the ideas were. That, of course, was ridiculous in the light of our present ignorance of such things.

SOME OBSERVATIONS ON DEMENTIA PRÆCOX

By Walter L. Treadway, M.D.

(By invitation)

The paper dealt with dementia præcox in men, and called attention to the fact that it is no longer to be questioned that in the genesis of dementia præcox the so-called shut-in type of personality is essentially the type that breaks down with this disorder. The original description of the shut-in type of personality left out, to quite a considerable extent, the abnormalities in the sexual life of these individuals. Dr. Treadway pointed out that in the development of sexuality certain types of shut-in personality show an inability to fuse the tender feelings and the sensual feelings, and to bestow the two together on an adult object. The Œdipus situation plays the important part in preventing the biological demands of adult life properly to adapt itself,—i. e., an inability to replace the infantile tendencies with an adult object,—hence a defective adaptation in love affairs, mating, and propagation; in other words, a defect in the instincts.

The first case considered was that of a normal man with externally an excellent adjustment to life, but with evident difficulties in the sexual sphere. He was quite capable of having sexual relations with women, but for them he had no tender feelings. He was also quite unable to have any erotic desire for a woman for whom he had a real feeling of love or reverence. Two women for whom he held this tender feeling were older than he, and of them he drew a plain parallel with his mother, so that both represented mother substitutes. This case was presented with a view to bringing about a better understanding of the cases which followed.

The article was not confined to the make-up of dementia præcox cases, but to some points about the precipitating causes, and about the content of the psychosis.

The first case of dementia præcox presented a shut-in personality with the following abnormal traits in his sexual life.

Although the purely sensual side of his sexuality seemed not to be repressed, he was decidedly defective in his capacity to make love and to contemplate marriage seriously. Such abnormalities were considered an evidence of an infantile attitude, so far as love and marriage were concerned, and represented an inability to develop beyond the mother attachment. This case showed that the man's ideas which referred to his getting an independent position in life, and the finishing of his apprenticeship, were closely related with the idea of marriage, and owing to his make-up it was precisely that from which he shrank so much. It was then regarded that the taking up of a definite life work, and the final coming into sight of the termination of his apprenticeship, represented the precipitating cause, or the precipitating cause acted in the same direction in which the defect of his make-up tended. The content of his psychosis was marked by homosexual features, but there was also another part which represented the wish not to go through the apprenticeship, not to have sexual power, all of which was connected with his ideas of marriage

The trend was an expression of a regressive sexuality; that is, of non-adapted love; namely, in this case homosexuality. So that make-up, precipitating cause, and content were the expression of the same innate tendency or defective adaptation.

Two other cases were briefly reviewed.

The second case of dementia præcox was that of a typical dementia præcox make-up. But in this case the subject broke down, not under the demand for adult love, but when his father died. A manic-depressive personality would have developed a retarded depression, but in this case the subject developed a crude infantile sexual trend. At first glance it looked as if the principle of the two cases were very different, but much similarity was in evidence. In the first case of dementia præcox the patient broke down because he was unable to meet the demands of adult love; he was unable to do that on account of his infantile tendencies. In the second case of dementia præcox no demand was made, but the infantile tendencies became suddenly inflated through the death of the father, *i. e.,* his rival. The patient presented a very infantile trend, a cosmic formulation, of having relations with his mother, of being his father, and of recreating himself with his mother. The principle, however, that the make-up, the precipitating cause, and the content of the psychosis were closely connected and worked all in the same direction, was again evidenced in this case as well.

The third case of dementia præcox showed a very marked incapacity for adult love which stood distinctly in the foreground, and was rather more marked than his general shut-in tendencies. No definite precipitating cause was demonstrated. But the case showed an interesting feature which formed a parallel to the precipitating causes, especially that of the second case of dementia præcox reported. He changed his habits after the father's death, began to wish to appear more manlike, drank, and became an agitator. The inflation which the unconscious tendencies received after the death of the rival was in this case not transformed into psychotic symptoms so much as into fairly well adapted habits,—in other words, sublimated. He got an outlet in more association with men, in drinking with them, and in becoming a revolutionary spirit. His trend was essentially a homosexual one. Aside from the usual homosexual accusations, his ideas chiefly were that he was changing into a woman. Here, as in the first præcox case, one of the typical escapes from real love destiny was chosen, the path of unreal adult love, that of homosexuality. In this case the trend and the make-up were the result of the same tendencies.

The following points were brought out:

First: That the adaptation defect in the sexual sphere, although it may express itself in a complete shunning of all sexual relationship with the opposite sex, may often not lead to any marked repression of mere sensual sexuality, but may gravely interfere with the capacity to meet the demands of adult love,—*i. e.,* marriage.

This is of course a trait not confined to dementia præcox, but is one of the ways in which, as Freud has shown, the defect of sexual adaptation may manifest itself in any neurotic individual. The first case reported was a good example of this.

Second: That when we fully appreciate the internal unconscious meaning of the defect of sexual adaptation,—namely, the fixation in an infantile state of attachment to the parent of the opposite sex—it is clear that the

peculiarities of make-up, the nature of the precipitating causes, and finally the content of the psychosis are very closely related, in that they all are dominated by the incapacity to fulfil the demands of adult love, and the desire to get away from this.

The trends described in the cases here reported are either a direct expression of the desire to avoid marriage, or they represent an escape in the sense of homosexuality, or they are directly of the nature of plain infantile sexuality.

Dr. Hoch stated that it seemed to him very valuable to bring out the points which Dr. Treadway had just developed, by demonstrating the possibility of viewing the make-up, the precipitating cause, and the ideas expressed by the patient (the so-called content of the psychosis) from a common point of view, namely, from that of an underlying defective development of instincts. He stated that after the earlier studies on make-up in dementia præcox, which had led more to a surface description of the essential traits of the constitutional abnormality, it had more recently become possible to demonstrate that the stunted development of the adult love instinct represented an important component of the make-up of dementia præcox cases, and that this inadequate development also showed itself in the ideas expressed by the patient, which betrayed motives belonging to an earlier stage of development.

Seeing a significant point in connection with one of the cases presented by Dr. Treadway, that of the workman who as soon as he had finished his apprenticeship found it impossible to go on doing his work, Dr. MacCurdy said that a striking thing in this instance was that no difficulty whatever had been experienced with the work until a time was reached when the training was finished and the man had reached an independent position; everything went smoothly until that particular period was reached which, according to the confession of the patient, was identified with the assuming of a certain responsibility,—that is he was now a worker for a higher wage and could afford to marry. Confronted by the removal of all obstacles that heretofore had deterred him from this step, which he seemed to consider a duty, he suddenly found it impossible to do the same sort of work which he had been doing before to the satisfaction of those who employed him. Evidently, at the time of the breakdown, the work was no longer viewed as a thing in itself, but rather was unconsciously considered in the light of its associations. A knife which a man carried around with him, using it to cut his bread, or sharpen a pencil, is of course to be regarded as simply a knife. But when a man feels that the knife *must* be carried, through the force of some compulsion he would be at a loss to explain, which fills him with a feeling of goneness if he does not have it with him, then, to him, the knife has ceased to be a mere knife, and has assumed an importance that can be explained only as being symbolic. So, in the case under discussion, it seems reasonable to conclude that the illness came not from any strain directly attributable to the work itself, but rather from conditions which in the patient's mind had become identified with the finish of his apprenticeship and the obtaining of an independent position in life—conditions which, since he felt it impossible to meet them, put in motion the associated feeling of an inability to go on working, as he heretofore had done.

Dr. Clark commented upon one of the cases presented in Dr. Treadway's paper, that if it be true that the primary fault in dementia præcox is an inherent inability in the individual to adapt himself to the socialistic tendencies of adult life, and particularly to the main purposes of a proper

marriage, then is it not possible for us to see some therapeutic advantage in this conception? If one may be fairly certain of this position, why not arrange the lives of the præcox to the simpler adolescent tasks whose trends do not lead essentially into situations that call for these impossible demands? Industrial occupations, shop, farm and garden work and life led apart from the temptations for heterosexual life, may conserve the præcox from the deterioration consequent from being measured up to a standard he cannot meet. This position would possibly render stationary the cases which are first made quiescent by hospital treatment; but to be fully effective the præcox would have to be diagnosed and placed under treatment early, whereas at present only too frequently he is not even seen by physicians. The early detection of the sinister import of the shut-in type of personality in adolescence is very imperative as we gain a truer insight into the essential pathogenesis of the disorder. All agencies dealing with children should be keenly aware of some of these newer studies in order that the above conservation principle of treatment may be applied.

Translations

VAGOTONIA

A Clinical Study

By Privatdozent Dr. Hans Eppinger and Dr. Leo Hess

of Vienna

Translated by William Max Kraus, A.B., M.D., and
Smith Ely Jelliffe, M.D., Ph.D.

We shall now try to present some basis for this idea:

We have frequently observed that vagotonia occurs most
often in young people. Experimental pathology also has taught
us that a higher vagal tone is to be expected in young animals
than in adults. Furthermore, according to Bartel.[35] Lymphatism
is found with decreasing frequency as age increases. Since we
know that the thymus disappears after a certain age, while in
youth it is almost a physiological organ, the above-mentioned facts
cannot fail to be both striking and noteworthy. We believe also
that we can derive some additional proof from Graves' disease,
which is so often associated with a persistent thymus. We have
learned from the researches of Tacher that in Graves' disease an
accumulation of lymphoid tissue occurs in the thyroid and in
the more usual places, where this type of cell is found. Further
that this is more pronounced the longer the duration of the
disease has been. This suggested the hypothesis that a substitu-
tion or healing process was taking place, the lymph tissue growing
to replace some diminution in the activities of some other organ.
This idea had been advanced by earlier authors. Mikulicz recom-
mended thymus preparations in the treatment of Basedow's
disease, and his reports leave the impression that some good was

[35] Bartel, J., Über Konstitution und Krankheit. Verhandlungen der
Deutschen pathologischen Gesellschaft, 1910, 14 Tagung.

done by its administration. We ourselves have noted that lymphatism and the signs of persistent thymus were most pronounced in the markedly vagotonic forms of Basedow's disease. And it is of further interest that our vagotonic showed an eosinophilia and relative lymphocytosis, the same as in the vagotonic Basedow cases. Recently Bartel [36] has studied the question of status thymicolymphaticus from the anatomic point of view.

He concludes that lymphatism and persistent thymus are part of a general state of inferiority, one of whose manifestations is a decreased resistance to many noxious influences. What interests us most, however, is the coincidence of lymphatism with just that group of diseases which we ourselves have found associated with vagotonia. He finds, for example, that certain diseases are never associated with a lymphatism, while in others it is a frequent finding. It is of special significance that Bartel never found carcinoma and lymphatism associated, while cases with sarcoma, a disease of youth, frequently showed lymphatism as well.

He proposes the theory that there exists in the constitutional inferiority of status thymicolymphaticus some factor which predisposes to certain diseases and against others. Now the fact is that just those diseases which we have found to be vagotonic in nature, or which are readily developed upon a vagotonic basis, are, according to Bartel's findings, combined with lymphatism. This may be shown in part by clinical observations. We have shown that in many cases of vagotonics there is enlargement of those parts of the lymphatic system which are enlarged in status thymicolymphaticus. More accurate proof we have not, since this proof is based on anatomical findings. Probably the anatomical entity status thymicolymphaticus corresponds most closely to the clinical entity, exudative diathesis, which Czerny has described. But there is great difficulty in determining this clinical entity anatomically, since in children it is difficult to set a limit between normal and enlarged lymph tissue. Clinically Czerny's exudative diathesis corresponds most closely to vagotonia. One may even go so far as to say that the exudative diathesis, with its tendency to spastic states and convulsions, to vascular disturbances and exudations, is but an infantile form of

[36] Bartel, J., "Über die hypoplastische Constitution und ihre Bedeutung," Wiener klin. Woch., 1908, No. 22.

vagotonia. It is greatly to be desired that pediatricians should aid us by an analysis of the symptoms found in children with exudative diathesis. Our theory is much strengthened by Strümpell's observation that those who are affected with bronchial asthma are, perhaps, of the class who have had the exudative diathesis in childhood.

It may be seen that we have found in our conception of vagotonia a way to discover in various types of individuals a definite constitutional state, which in some cases may predispose to disease, in others may give a disease a definite course. This has given a degree of unity to phenomena which hitherto have been considered both clinically and anatomically as due to various kinds of predisposition.

The criterion, which clinicians and anatomists have used to describe the origin of these predispositions, has up to now been only morphological. The important thing has been the lymphatic tissues, and their reaction to various stimuli. Nothing could be said of the function of this reaction, except that it was associated with some degree of constitutional inferiority.

Since statistical studies have shown that length of life as well as morbidity are closely related to these morphological changes, one may say that lymphatism, combined with status thymicus, comprise a remarkable constitutional state of inferiority, and is related to a predisposition to certain definite diseases.

Our attempt to determine a form of predisposition by functional tests of a chemical nature brings up the very interesting question, is there any parallelism between a clinical and anatomic predisposition? In our opinion this parallelism may be doubly demonstrated. Just as Bartel states that lymphatism is a partial manifestation of constitutional inferiority, and is frequently associated with developmental anomalies, so do we believe that vagotonia is a partial manifestation of an inferior organism. We feel that the chromaffin organs, like other organs, may be arrested in their development. Thus adrenalin would be produced in lesser amounts, and its antagonist would take the upper hand. This should be considered particularly in cases of general vagotonia.

There are many clinical proofs that defective development of the adrenals, and thus their functional activity, plays an important part. We find that cases of vagotonia have enteroptosis, are of

the degenerate type of individual, and frequently have neuras-thenia, hysteria, high arched palates, flat foot and syndactily in association with the symptoms of the vagotonia.

We must also consider the possibility that vagotonia, which improves with advancing age, and in fact may even disappear, and yet, under certain pathological conditions may reappear, may be closely related to an overactivity of some of the glands of internal secretion. Thus a state would be produced by this change in the interrelations of the glands of internal secretion, which could certainly not be considered an anatomic form of constitutional inferiority.

We feel that vagotonia may very probably be the clinical component of the anatomical lymphatic constitution.

The parallelism between the clinical picture of status thymicolymphaticus, uncertain though it may be, and the readily demonstrable anomalies of vagotonia, makes us very prone to believe out theory of their relation to be true. The fact that we could nor give a clinical demonstration of status thymicolymphaticus in many of our vagotonic cases, is not weighty evidence against our theory, since status thymicolymphaticus may only be demonstrated anatomically. Furthermore, it is unusual to have a typical vagotonic come to autospy, since vagotonia occurs most usually in the youthful. Yet we were able in a few cases to confirm the parallelism of vagotonia and status thymicolymphaticus at autopsy. We hope to be able to demonstrate this experimentally.

In closing, we wish to say a word about the etiology of the mixed forms of vagotonia. Perhaps these are due to a polyglandular disturbance of endocrinous nature. Thus the picture of vagotonia would be obscured. Just as the typical action of physostygmin is obscured by using curare with it. At all events, these cases offer a very fertile field for clinical study.

(To be continued)

Periscope

Review of Neurology and Psychology

(Vol. XII, No. 6)

1. The Nature and the Treatment of the So-called " Genuine Epilepsy,"
   G. C. BOLTEN.
2. Notes on a Case of Pellagra. D. MAXWELL ROSS.
3. Babinski's " Second Sign " of Organic Hemiplegia in Hemichorea, and
   its Bearing on the Organic Nature of Chorea. ARTHUR F. HERTZ.

1. *Treatment of So-called " Genuine Epilepsy."*—A summary of this article is as follows:

1. Of the numerous cases of epilepsy which make their appearance quite as genuine epilepsy, an important part, depending upon collective, divergent, primary cerebral affections, belongs to the cerebral (secondary, symptomatic) epilepsy, and but the smaller part ($\pm$ 25 per cent. concerning our cases) to the so-called genuine (essential, idiopathic, or primary) epilepsy.

2. Even now it is quite impossible to distinguish, less on pure clinical symptoms, most cases of cerebral from genuine epilepsy.

The differential diagnosis between these divergent affections must move itself in the sphere of the pathology of metabolism.

3. Genuine epilepsy is a chronic auto-intoxication, caused by a hypo-fermentation of the intestinal tract and of the intermediary metabolism, as a consequence of a hypofunction of the thyroid and parathyroid glands (or of troubles in their nervous elements, to know the sympathetic nerve).

4. Genuine epilepsy is quite curable by the administration, rectally, of fresh pressed extracts of the insufficient glands, or better, it is possible, in this manner, to free the patient from all symptoms, as I have proved in a great series of cases.

2. *Notes on a Case of Pellagra.*—The patient was a mill girl from Leith and was treated at the Royal Edinburgh Mental Hospital. Mentally, she was at times mildly delirious, and when not delirious was depressed and neurasthenic. The alimentary symptoms were diarrhea with hemorrhoids. There were no gastric symptoms. No stomatitis is noted. Neurologically, there was the usual exaggeration of the reflexes; and death occurred in clonic convulsions. The dermatological symptoms were very slight and transient in character, but were the first to attract attention. They were described by the nurse in charge as a " bad case of sun-burn." The hands were the chief site of the lesions. The lesions were characteristic. Bacilli pyocyaneus were found in the intestine. On post mortem the calvarium and the meninges were found much injected, and in several places on the cortex there were minute pial hemorrhages. There was marked excess of cerebro-spinal fluid. The brain was soft, and weighed only 43½ ounces. Subsequent microscopic examination of tissue removed from the cortex showed little pathological change. There were no definite degenerative changes, no arteritis, and no increase of neuroglia. Unfortunately, the cord was not removed.

3. *Babinski's " Second Sign " in its bearing on Chorea.*—This sign was described by Babinski as " combined movement of the trunk and

pelvis." In organic hemiplegia, in attempts to sit up from the dorsicumbent position, the paralyzed leg always rises higher than the other. In seven (7) cases of hemichorea, tested by the writer, the leg on the affected side rose higher than the other although the plantar reflexes were both flexor and the cutaneous and tendon reflexes were equal on the two sides. As this sign has never been observed in any case of hemiplegia which was not organic, its constant presence in hemichorea points strongly to the conclusion that the upper motor neurone is affected by some organic change in hemichorea, even if it is of a kind which escapes recognition by the ordinary methods of histological examination, and as Babinski's second sign is constantly present in hemichorea, it may reasonably be concluded that the lesion with which it is associated is constantly present in ordinary cases of bilateral chorea. As this sign is the only evidence of the existence of an organic lesion in hemichorea, and as it depends on a comparison between the two sides, direct evidence of the organic nature of the nervous symptoms in ordinary chorea is still wanting.

C. E. Atwood (New York).

Journal of Mental Science

(Vol. 57, No. 238)

1. Morison Lectures; The Differentiation of Melancholia, the Depression of Manic-depressive Insanity. George M. Robertson.
2. The Pathogenesis of a Delusion. Henry Devine.
3. Witchcraft, Demoniacal Possession, and Insanity. Hubert J. Norman.
4. Some Instances of Sudden Death with Post Mortem Findings. J. Francis Dixon.
5. Asylum Dysentery. W. J. Adams Erskine.
6. Syphilis and Congenital Mental Defect. C. G. A. Chislett.
7. The Treatment of Puerperal Insanity with Anti-streptococcic Serum. Nathan Raw.

1. *Differentiation of Melancholia. Morison Lecture.*—A complete discussion of melancholia or the depressive phase of manic-depressive insanity, with which classification the author is in accord. The classical symptoms such as depressed or painful emotions, retardation both mental and motor, delusions explanatory in character, tendency to suicide, et cetera, are described in detail. The importance of a thorough physical examination and the careful treatment of any disorder, the necessity for the supervision of the feeding of such cases to guard against starvation, and the need for constant watchfulness to prevent suicide, are all emphasized.

2. *Pathogenesis of a Delusion.*—Devine calls attention to the importance of going beyond the formal classification and prognostic determination in examining an individual case. In illustration of the value of a closer study, he has, by association test and subsequent analysis, traced the development of a hypochondriacal delusion with reëducation of the patient and final recovery.

3. *Witchcraft and Insanity.*—In a general discussion with historical examples, the writer points out that primitive religion was based on the long existing and universal belief in evil spirits. It was but a short step to witchcraft, and misapplication of Scriptural texts, with hysterical or insane actions and utterances wrongly interpreted, coupled with superstition and ignorance, gave rise to centuries of persecution.

4. *Sudden Death with Post Mortem Findings.*—Dixon narrates cases in which sudden death was an unexpected termination. Among these were (as determined by autopsy) septic infarcts of the lung from a sacral bedsore, tumors and abscesses of the brain, aneurysms of various localities and obliteration of a coronary artery by endarteritis.

5. *Asylum Dysentery.*—After enumerating the recognized etiological factors of dysentery, *i. e.*, overcrowding, possibly constipation, dirty habits of the insane, peculiar condition of the nervous system, and the presence of dysentery carriers. Erskine discusses three other causes. He is of the opinion that the presence of kidney disease, tuberculosis or influenza renders cases more liable to dysentery. In the case of influenza, that alone may be a potent cause for the intestinal condition as was shown in an epidemic described.

6. *Syphilis and Congenital Mental Defect.*—Chislett reports the results of Wassermann reaction in a number of cases of congenital mental defect. Out of fourteen idiots and imbeciles eight gave a positive Wassermann. Three cases of juvenile general paresis gave positive reactions. Out of three epileptic idiots, only one gave a positive Wassermann. Three paralytic idiots gave negative reactions. A whole family in which the father was an acknowledged syphilitic was examined. There were ten pregnancies, two children premature, and two died in infancy. Of the six living children, three gave positive reactions, only one of which showed suspicious clinical signs, although one other was nervous and stupid. The mother had a tertiary lesion on the leg eight years after marriage.

The writer calls attention to the possibility for prophylactic measures to prevent congenital mental defect.

7. *Treatment of Puerperal Insanity.*—Raw states his own conclusions as follows: 1. Puerperal insanity is only rarely if ever caused by septic infection at the puerperal period. 2. Anti-streptococcic serum of a polyvalent nature seems to exert a very favorable influence in many cases of puerperal infection, but does not appear to influence the course of the mental process. 3. Puerperal insanity, of whatever variety, is most favorable for cure in a properly equipped mental hospital, provided that the treatment is undertaken immediately after its onset.

The question as to what constitutes so-called "puerperal insanity" is not discussed.

W .C. Sandy (Kings Park, N. Y.).

(Vol. 57. No. 230)

9. The Deviation of Complement in Cases of So-called Idiopathic Epilepsy. G. H. GARNETT.

1. *Geographical Distribution of Insanity and Other Conditions in Ireland.*—From a study of statistics, Dawson reaches the following conclusions. In Ireland, insanity tends to prevail in the agricultural counties and has a close relation—if special conditions be disregarded—to pauperism, which also prevails in the rural districts. The distribution of insanity corresponds to but a very small extent with the emigration rate. It bears some little relation to the prevalence of criminality, and to that of chronic alcoholism. No appreciable relation is apparent between the insanity rate and density of population, rateable valuation of land, distribution of the number of aged persons, death rate (either general or tubercular) or drunkenness. The amount of insanity ascribed to alcohol is small and its distribution has no relation to that of drunkenness but some to insanity in general. Pauperism in Ireland bears little relation to poverty and does not correspond to the rateable valuation of the land nor is it closely connected with emigration. Criminality, as in England and Wales, is greatly in excess in the large towns, the rural districts being relatively free; but on the other hand, in Ireland drunkenness is found to be more prevalent in the rural counties which is the reverse of the condition across the Channel. A number of tables are appended upon which the above conclusons are based.

2. *Personal Equation in Alienism.*—Drapes calls attention to the opportunity that exists for varied conclusions in the estimation of a given set of phenomena in the different fields of science such as psychology, physical science, etc. In alienism, it is especially seen in classifications and he mentions the dementia præcox controversy that exists in England as an illustration. Moreover, there is a difference in the reaction of different individuals, races and so forth, to the same disturbing agency, making another element to be considered in each individual case. The author mentions a former paper in which he advocated the idea of the unity of insanity, one malady throughout, but manifesting itself in many forms and phases, but not to be regarded as distinct disease entities.

3. *Psychotherapy in Mental Disorders.*—After calling attention to the fact that the English have taken little interest in psychical methods of treatment as compared with the French, Germans and Americans, Graham discusses the question under these heads: (a) Suggestion, waking and hypnotic, (b) therapeutic conversation, (c) psychoanalysis, (d) occupation, (e) reëducation. In the general discussion following, widely different opinions as to the efficacy of psychotherapy are expressed.

4. *Note on Hereditary Psychoses.*—Leeper calls attention to the defects of a Poor Law which allows reproduction to go on among the feebleminded both legitimately and illegitimately, a constant source of hereditary insanity. He quotes Burton's " Anatomy of Melancholy," where it is said that in Scotland men with certain dangerous diseases which are likely to be propagated " are gelded," women kept from the company of men, and so forth, showing that the principles of eugenics were apparently well recognized even in the 17th century.

5. *Causes of Sudden Death in Epilepsy.*—Collins investigated ten cases, and found the cause of death in two was choking from particles of food, in one suffocation during fit, in one mitral and aortic disease, adherent pericardium in two, advanced disease of the heart (fatty) in three, and cerebral tumor in one. In only one case was the brain congested. This is in sharp contast to the findings of Marchand who, out of fifteen cases,

finds five of ruptured heart or aorta, and six by rupture of cerebral or meningeal vessels. Twice was congestion of the brain noted as the sole finding. The author also discusses treatment of confirmed epilepsy, favoring colony life, a reasonable diet and interesting employment in the open air, with bromides to control excess of fits, malaise or excitement.

6. *Mental Symptoms in Choreiform Diseases.*—Mapother names the conditions in which choreiform movements may appear as follows: (1) Sydenham's chorea or chorea minor, (2) Huntington's chorea, (3) chorea dependent upon gross organic brain lesion, (4) "senile chorea," (5) hysterical chorea. Associated with Sydenham's chorea, there may be severe delirium-like symptoms or the symptoms of manic-depressive insanity, manic phase. Such cases occur commonly during pregnancy. There are also cases in which marked dulness, apathy or despondency characterizes the mental state. In Huntington's chorea, there is a gradual progressive mental deterioration extending over years, with exacerbations. During the latter, there may be impulsive acts of irritability, hallucinations and delusions. The mental symptoms associated with chorea dependent upon gross organic brain lesions are not characteristic but depend upon the location of the lesion. Senile chorea in some cases resembles Huntington's chorea, in other cases seems to be the result of diffuse arteriosclerosis. Associated with hysteria, chorea may be either rhythmic or arrhythmic. The former is most common and occurred in epidemics during the fourteenth and fifteenth centuries under the influence of religious excitement. The movements are accompanied by amnesia and may be checked by suggestion. Arrhythmic cases are commonly imitations of some case of Sydenham's chorea seen by the patient. Interesting features are the sudden onset, and prolonged course, also the readiness with which it may be cured by suggestion.

7. *Bacteriological Investigation of Blood.*—Sewell and McDowell investigated twelve cases of excitement with confusion, 27 of melancholia, and eleven of chronic psychoses with the hope or expectation of finding microörganisms in the blood. In only one case were any found and in this it was unimportant so far as the mental condition was concerned. In one case Staphylococcus pyogenes aureus was found, but this patient had attempted suicide by gashing her throat, and the infected wound accounted for the microörganism.

8. *Mental Inspection in Schools.*—Steward, a school inspector, recommends that all backward or abnormal school children be examined around the age of nine to eliminate them from the ordinary school course and furnish them with special tuition. He outlines a printed form for the examination, consisting of first, a teacher's confidential report on the standard of school work, character, habits etc.; second, psychological examination, with anamnesis, physical and mental tests.

9. *Deviation of Complement in Idiopathic Epilepsy.*—Using urine of epileptics as antigen, blood serum of epileptics as the source of the antibody, serum of normal rabbit as complement, hemolytic serum from a rabbit, suspension of human red blood corpuscles as indicator, Garnett came to the following conclusions: (1) Serum of epileptics contains some substance of the nature of a specific antibody. (2) Urine of epileptics contains very generally a toxin or substance specific to the antibody contained in the serum. (3) Serum of normal persons (not epileptic) does not contain this antibody. (4) The urine of some sane non-epileptic persons and some insane non-epileptics contains a substance which when mixed with serum of an epileptic, is capable of deviation of one and two

but rarely four minimal hemolytic doses—only 5 per cent. did so. (5) Urines of epileptic patients, when mixed in certain proportions with the serum of epileptics, are capable in a much larger proportion of deviating four minimal hemolytic doses of complement. In the second series of observations, 44 per cent. did so, in the third, 30 per cent. (6) The results are only striking when regarded comparatively, *i. e.*, when the positive results obtained with the epileptic patients are compared with the positive results obtained with non-epileptic persons. This method of observation, therefore, is of little value as a diagnostic of epilepsy. (7) The results of these observations are also of practical interest because if further study prove that some forms of epilepsy are of toxic origin, it should be possible to extract toxins from the urines of epileptic persons and to use these toxins as specific vaccine in the treatment of the disease.

(Vol. LVIII, No. 240)

1. Address in Neurology and Psychiatry, Australasian Medical Congress. W. BEATTIE SMITH.
2. The Classification of Insanity. JOHN TURNER.
3. The Development of Psychiatric Science as a Branch of Public Health. R. G. ROWS.
4. Some Points Complementary to the Institution of Post-Graduate Instruction in Psychiatry. DAVID ORR.
5. Sterilization from the Eugenic Standpoint, with Heredity Statistics. GEOFFREY CLARKE.
6. Some Statistics about Sterilization of the Insane. A. W. DANIEL.
7. Amenorrheal Insanity. C. T. EWART.
8. Further Investigation on the Cerebro-Spinal Fluid in Insanities. G. SCOTT WILLIAMSON.

1. *Address in Neurology and Psychiatry.*—A discussion of some of the problems in psychiatry, especially the determination, if possible, of the causes of insanity, the importance of which is emphasized if success in the work is to be accomplished. The author calls attention to the probable overstatement of the alcoholic factor in view of the comparatively few pathological findings in asylums which may be traced to alcohol. An extensive statistical study of asylum pathological records is advocated to determine if possible the relation between the post mortem findings and the type of insanity. Such a study even if productive of negative results, would, in the writer's opinion, be of considerable value.

2. *Classification of Psychoses.*—Turner advocates essentially the present day classification, dividing insanity in two groups—1. idiopathic or hereditarily predisposed, embracing by far the larger number of individuals. 2. The traumatic or accidental.

The former he subdivides into three classes, (*a*) imbeciles, (*b*) dementia præcox, (*c*) acquired insanities, *i. e.*, epilepsy, delusional insanity, "lucid insanity" (meaning obsessions, psychasthenia, etc.), hysteria, affective insanity (manic-depressive), confusional insanity (exhaustion, alcohol, etc.), involutional insanity (mania, melancholia and dementia of this period).

In the second principal group are placed all cases of insanity arising from gross lesions of the brain, *e. g.*, infantile and senile cerebro-pathies, general paralysis, tumors and injuries.

3. *The Development of Psychiatric Science.*—Rows gives an account of the clinical and scientific departments of the psychiatric clinics in Ger-

many, calling attention to their importance and to the need of similar methods in England.

4. *Post-Graduate Instruction in Psychiatry.*—Orr writes on the evils of the asylum service in Great Britain from the assistant physician's standpoint and makes three recommendations. (1) Those who have decided to adopt the lunacy service as a specialty must be properly trained. Postgraduate courses have been considered and provided. (2) After a period of probation, say three years, asylum committees should consider an application to live outside, away from quarters, either in a house on the estate or in close proximity to the institution. (3) Every permanent assistant medical officer must have legal recognition.

5. *Sterilization from the Eugenic Standpoint.*—Clark has summarized his conclusions as follows:

1. Admitting inheritance to be the most important factor in mental constitution, it has yet to be shown that any practicable scheme of sterilization would materially diminish the normal increase of insanity.

2. We have no right to hold out a hope of material decrease from the statistics at present at our disposal.

3. There is urgent need of better record of family histories which should be kept separate from the present useless conglomeration which compose our statistics.

4. The suggestion is made that the chief danger from the eugenic standpoint is the large class of mental degenerates who are not insane.

5. The opinion is expressed that sterilization ought to be recommended in some cases of mental disease quite irrespective of the eugenic standpoint.

6. *Sterilization of the Psychotic.*—Daniel argues from the study of statistics of committed cases of insanity which after discharge had children, that only about 1.5 per cent. of total admissions to asylums would be prevented by sterilization of the insane before discharge. He is opposed, therefore, to sterilization as absolutely impracticable.

7. *Amenorrheal Psychoses.*—This is a small abstract of a paper which was published in the Transactions of the Royal Society of Medicine. The abstract is little more than a table of contents, and the original paper would evidently have to be read in order to ascertain the author's conclusions. In the extensive discussion which has been reported, it is clearly seen that many of those who heard the paper, were not in favor of the term "amenorrheal insanity."

8. *Cerebro-spinal Fluid in Psychoses.*—In a preliminary report of investigations undertaken to determine the reason for the discrepancy in the results when applying the Wassermann reaction to the cerebro-spinal fluid and blood serum of general paralysis the authors found and here record results significant in other directions. In these investigations it became necessary to detect the presence of blood-serum in the cerebrospinal fluid and this was done by testing for a ferment normally present in blood-serum capable of splitting a synthetic di-peptide glycol-tryptophane into its two components. This ferment is not present in normal secretions such as cerebro-spinal fluid, synovial fluid, etc. A positive ferment test in cerebro-spinal fluid was obtained in cases of irritative conditions such as tubercular meningitis, tabes dorsalis, uremia, etc. Therefore, it seems probable that the presence of this ferment in cerebro-spinal fluid means an irritative transudation though not necessarily inflammatory. In view of this, it is interesting to note that every cerebro-spinal fluid giving a positive Wassermann reaction contained the ferment. This

might indicate some underlying cause for irritation in such insanities which should be treated and not palliated. The authors also compared the Noguchi with the Wassermann test and found that they accord in 95 per cent. of cases. Attention is called in passing to severe after effects of lumbar puncture in certain young congenital imbeciles for which as explanation the theory is advanced of a possible patent ductus endo-lymphaticus.

W. C. SANDY (Kings Park, N. Y.).

Miscellany

REGENERATION OF MEDULLATED NERVES IN THE ABSENCE OF EMBRYONIC NERVE FIBERS, FOLLOWING EXPERIMENTAL NON-TRAUMATIC DEGENERATION. Elbert Clarke. (The Journal of Comparative Neurology, Vol. 24, No. 1.)

The present study is based upon experiments in which degeneration and regeneration of medullated nerve fibers were brought about under new experimental conditions. The results obtained relate, for the most part, to phases of the subject upon which the evidence has heretofore been incomplete. In this investigation, an experimental obstacle which has been responsible for the strikingly contrary observations between the supporters of auto-regeneration on the one hand and the advocates of an outgrowth of the axis cylinder on the other, has been entirely avoided. This refers to an ingrowth of foreign nerve fibers through the scar tissue into a regenerating medullated nerve. This obstacle was avoided by inducing degeneration in the peripheral medullated nerves of the domestic fowl by a prolonged exclusive feeding of polished rice, and subsequent regeneration by a return to an adequate nutritive diet.

The author shows that in the experiments described degeneration of medullated nerve fibers was brought about in fowls by a prolonged feeding of polished rice, and regeneration was accomplished by a return to an adequate nutritive diet. In such fowls the fibers are intact during degeneration and all traumatic and inflammatory effects produced by cutting the tissues and the nerve or of tying the latter are obviated; the process of degeneration can be stopped at almost any stage or greatly prolonged, and several stages of degeneration are to be observed in different fibers of the same nerve. In regeneration the possibility of an ingrowth of fibers from other nerves into the regenerating nerve under observation is eliminated and repair of the medullated nerves can be induced after any stage of regeneration. Ten to twenty per cent. of the medullated fibres of the nervus ischiadicus showed a complete fatty change of their medullary sheaths into globules of degenerated myelin and a segmentation or granulation of their axis cylinders. No multiplication of the nuclei of the neurilemma sheath could be observed and consequently no embryonic nerve fibers or Bandfasern. During recovery these degenerated nerve fibers attained new axis cylinders and the medullary sheaths returned to the normal. In other words, regeneration has been observed to follow degeneration in medullated nerve fibers without passing through the embryonic nerve fiber or Band-faser stage. By prolonging the degenerative process there resulted a multiplication of the nuclei of the neurilemma sheath. This and other experiments described tend to show that the embryonic nerve fiber may be coincident with a late stage of degeneration in medullated nerve fibers. It may not represent an early stage of regeneration and its presence does not

signify an attempt at regeneration on the part of the medullated nerve fiber.

In the absence of the embryonic nerve fiber, the degenerated myelin was absorbed with extreme slowness, persisting as droplets after 1 year and 14 days. On the other hand, where the embryonic nerve fiber was formed the degenerated myelin quickly disappeared from the fiber. The conclusion is reached that the proliferating nuclei of the neurilemma sheath participate in the resorption of the degenerated myelin. In regeneration a new axis cylinder was attained by outgrowth and in the absence of the embryonic nerve fiber. The new axis cylinder grew down the old medullary sheath which latter still contained large globules of degenerated myelin and fragments of the old axis cylinder. The outgrowing axis cylinder was seen to branch, and in cross-sections of the nerves two new axis cylinders were observed within the same old medullary sheath. The embryonic nerve fiber could, of course, play no part in the formation of the new axis cylinder either by auro-regeneration or by outgrowth.

No indications of regeneration were observed in the fibers of the spinal cord.

JELLIFFE.

THE STRUCTURE OF THE ROOTS, TRUNKS AND BRANCHES OF THE VAGUS NERVE. M. R. Chase and S. W. Ranson. (The Journal of Comparative Neurology, Vol. 24, No. 1.)

Most of this work was done on the dog, although the rabbit, cat, rat and man also were studied. The sharp contrast in structure between sympathetic and vagus offsets any close anatomical proximity. The serial section method was followed. The general results arrived at are summarized: (1) The various rootlets of the vagus and accessory nerves differ markedly in structure. The spinal root of the accessory is composed almost entirely of large medullated fibers with a very few small ones. The bulbar rootlets of the accessory are composed of large and small medullated fibers, with the small fibers predominating. These rootlets contain few, if any, non-medullated fibers. The rootlets of the vagus are of two kinds. Those of type I, probably efferent in function, are composed of many fine and fewer coarse medullated fibers. The medullated fibers are evenly distributed through these rootlets and there are few, if any, medullated fibers. The vagus rootlets of type II, probably efferent in function, contain large and medium-sized medullated fibers and fewer small ones. The medullated fibers are widely separated by enormous numbers of fine, non-medullated axons.

2. At the level of the upper part of the jugular ganglion the vagus and accessory nerves are fused into a common trunk in which it is possible to distinguish three areas derived respectively from the spinal root of the accessory, and the roots of the vagus. Each area presents the same histological characteristics as the corresponding roots, except that the fibers from the two types of vagus rootlets are now intimately mingled.

3. Below the level of the jugular ganglion the spinal part of the accessory which has maintained its independence throughout the common vagus-accessory trunk, now leaves it as the external branch of the accessory nerve.

4. The bulbar fibers of the accessory become intimately mingled with the vagus fibers at or above the level of the nodose ganglion. The so-

called internal branch of the accessory does not exist as a separate nerve, but is only a fascicle of the common vagus-accessory trunk.

5. While the vagus and sympathetic nerves are intimately associated in the neck, it is clear that no considerable part of the non-medullated fibers of the vagus are of sympathetic origin.

6. The pharyngeal branch is composed for the most part of large medullated fibers, but also contains a considerable number of medium and small-sized medullated fibers. It contains few, if any, non-medullated axons.

7. The superior laryngeal branch contains large, medium and small-sized medullated fibers, with the medium and small ones predominating. It contains non-medullated fibers in considerable numbers; but these are much less numerous than in the vagus trunk.

8. The recurrent nerve contains an area of large medullated fibers destined for the larynx, and an area of medium and small-sized medullated fibers which are given off in its esophageal, tracheal and cardiac branches.

9. The pharyngeal, superior laryngeal and recurrent nerves take out from the vagus trunk almost all of its large medullated fibers, so that the vast majority of the medullated fibers in the thoracic vagus are either small or medium-sized. These are widely separated by non-medullated fibers.

10. The non-medullated fibers are present in much greater proportion in the thoracic portion of the vagus than in the upper part of the nerve. This is to be accounted for by the fact that a large number of medullated fibers have been taken away by the cervical branches, while practically all of the non-medullated fibers are carried down into the thoracic vagus. This increase in the proportion of non-medullated fibers in the lower part of the nerve is probably also in part due to pre-ganglionic fibers losing their myelin sheaths in their downward course.

11. Most of the medullated fibers in the thoracic vagus leave it through the bronchial and esophageal branches, so that the vagus as it passes through the diaphragm may properly be called a non-medullated nerve. It is composed almost entirely of non-medullated axons and contains only a few scattered medullated fibers.

JELLIFFE.

HYDROCEPHALUS, L. J. POLLOCK. (Journal A. M. A., Jan. 30, 1915.)

The author calls attention to the frequency of the association of hypopituitarism with chronic hydrocephalus. The causes of pituitary disturbances may be due, he says, to disorders of the gland itself, such as tumors, overgrowths or undergrowths, or they may be due to remote factors such as pressure caused by distant tumors and hydrocephalus. In severe hydrocephalus, the third ventricle, as well as the others, is distended with fluid and its cyst-like bulging presses on the underlying pituitary gland, the functions of which may be either depressed or exalted. In view of this fact, which is frequently shown in practice, its literature is scant. It has been noticed since by Marinesco and Goldstein in 1909, and Goldstein calls attention to the fact of its occurrence in an account of cases of hydrocephalus by other authors. Cushing also remarks on the scarcity of literature and other authors have given it more or less attention. Pollock refers to a previous article by himself, in which a case of dyspituitarism was reported by him, and the report of which is also given in this article. Since that publication in 1913, twelve additional cases have been observed.

ten in institutions and two in private practice. Three were described in
addition to the one already mentioned, one of them rather fully, with an
account of the postmortem observations. In all the cases, adiposity was
the predominating feature, ranging from simple moderate overgrowth to
actual monstrosity. Genital hypoplasia was observed but once, but all the
patients showed a delicate pudgy tapering hand with a broad base. In six
cases examined for increased carbohydrate tolerance, it was found, but
not much importance is attached to this. Thermic reaction following in-
jection of the extract of anterior lobe (Armour & Co.) was observed in
several of the six cases described. The specificity of the adiposity de-
scribed with pituitary diseases is not well established. Marburg first of-
fered the theory that adiposity occurs not only in tumors of the pituitary
but also in certain other cerebral growths of embryonic type, which cause
it independently of their localization by virtue of a specific internal secre-
tion. Pollock remarks that this is not altogether correct as is shown by the
cases with pressure on the pituitary from hydrocephalus without tumor and
from tumors of the pineal gland, not in the nature of a teratoma. Marburg
subsequently recognized a tumor of the pineal gland with hydrocephalus,
but in which the pituitary was not distended, though the infundibulum
was involved. He formulates three groups of pineal gland disturb-
ances: hyperpinealism, with obesity; hypopinealism, with genital atrophy;
and apinealism with cachexia. Pearce Bailey and Jelliffe have summed
up the literature and conclude that the whole situation needs more ex-
tensive study to determine whether pineal tumors alone can produce
adiposity, apart from the third ventricle hydrocephalus. In the fully
recorded case here noticed no conclusions as to the cause of the adi-
posity could be deduced, since both the hypophysis and the pineal gland
showed disturbances from the dilatation of the third ventricle. In con-
clusion, Pollock calls attention to the similarity of serous meningitis
to brain tumor and the possibility of pituitary symptoms leading to a
wrong diagnosis of tumor of the hypophysis. The effect of a cystic
third ventricle on the pineal gland deserves further study.

Book Reviews

This volume offers a new presentation of the problems of alcoholism and intemperance in a study brief and untechnical but based on wide knowledge and a fundamental insight into the nature of mankind. It departs from the ordinary ineffectual treatment of the outward symptoms of intemperance to deal with the real meaning and power of intoxication in human development, affording a true psychological basis for the control of this impulse and the direction of the force of which it is one expression.

The author's investigation begins even in the animal world. What is discovered there is more fully confirmed in an extensive study of primitive man and of early civilization, namely the relationship existing between intoxication and those states of excitement and exaltation that accompany the great racial functions, particularly reproduction. The intoxication impulse is at work as one important manifestation of instinct force proving its usefulness and necessity in the resulting increase of capacity for sustained excitement and a tendency toward that, which are essential to the creative activity upon which racial evolution depends. The impulse has manifested itself chiefly in religious activity and development. The excitement always demanded in this sphere has made intoxication appear pleasing to the gods or even divinely ordained, while many are the cults found throughout history dependent upon intoxication. Whether in the customs of widely scattered savage tribes or in the ancient Hindu soma worship; whether through stimulants the priest puts himself into the frenzied state necessary for communion with gods and spirits or the god is actually present in the wine, it is intoxication that produces the desired and effective religious condition. Out of these induced states on the other hand have arisen enlarged religious conception and quickening of faith in the supernatural. In its earliest uses moreover it was the accompaniment and source of a developing social consciousness, leveling natural barriers, producing good fellowship instead of original hostile relations and conducing to the establishment of guiding and restraining laws. For individual indulgence was not common among primitive peoples, rather intoxication was entered into by certain groups for special seasons and with definite purpose, and though great excess was the rule there followed regulated intervals of total abstinence. The very excess is a part of that deep-seated instinct to carry excitement to the point of abandonment to its highest culmination, which points to the fact that it is the state of intoxication that is sought rather than pleasure in the intoxicant.

In civilized nations again history testifies that a period of highest culture is preceded by intoxication expressing the intensity of the impulse for that excitement which, controlled and regulated, leads to the creative activity that marks the cultural period. This nature of the impulse makes intoxication likewise a characteristic of strong and dominant races. The narcotic side, on the other hand follows in a period of decadence and stagnation, when nations or individuals or certain groups of society can no longer turn the impulse to action but seek to escape the suffering inci-

dent upon inability to cope with the demands of existence and progress.

Literature and language testify to the important place of this impulse among all peoples. Medicine has witnessed through an exaggerated use of alcohol to the survival of the primitive conception of a life principle to be stimulated, an idea now modified and transformed and useful in psychotherapy in the principle of *aroused consciousness*.

Upon such well-laid foundation Dr. Partridge develops the practical side of his study. The individual manifests this impulse also as a part of the spirit of growth, that exaltation which must precede and accompany creative effort, and thus we find desire for excessive stimulation and the narcotic impulse following the natural periods of adolescent growth and maturer activity or of diminution of energy and interest. The excessive use of alcohol, now that its period of racial service is past, is abnormal and is found among two classes, those unable to rise above the level, where excitement fails to find its higher expression, and those so ill-balanced that they must seek narcotic effects.

The effect of alcohol on the individual can be studied by precise measurements and also by the examination of the feelings of the individual. In regard to the latter a large number of abnormal cases were examined by Dr. Partridge more or less fully according to opportunity and accurate laboratory tests were made upon normal individuals, ordinarily abstainers. The general conclusions agree. Physiologically alcohol is an injurious substance. It causes at first a temporary increase in physical and mental power but depression follows. There is however at one point a " feeling of power " in " intensity of consciousness " in which the individual feels himself freed from ordinary restraints and superior to ordinary limitations. This is allied to the social spirit which is so prominent in individual as in group intoxication and which is a predominant factor in the yielding to intoxicants.

It is upon an emphasis of its intrinsically social nature that the author would seek a cure for the prevailing evils of intemperance. So fundamental a craving, one which has served such broad racial purposes cannot be defined as sinful or immoral, nor can it be defined and eradicated as a physiological condition. It must be dealt with on broader terms. Education of the child and the youth for the guidance of his natural excitements into sustained and intensified activity through effective outlets, is the prophylactic need. The reëducation of the drunkard and readjustment of his surroundings so that new interests shall stimulate him and take up his energies, these will bring their own cure. Those opportunities for social contacts which the saloon has provided must not be neglected but there must be added what the saloon has failed to give, a " normal zest for life " and opportunities for real, effective activity.

This book is suggestive for such practical lines of endeavor based on a fundamental understanding of the problem with which it deals. It is stimulating too to further study and investigation into the deeper psychical nature of the social impulse bound with intoxication, the nature of the demand for the narcosis of alcohol, and further back the hidden relation between religious development and the intoxication impulse. Such are some of the problems to which this brief study might open the way.

<div align="right">JELLIFFE.</div>

The Journal

OF

Nervous and Mental Disease

An American Monthly Journal of Neurology and Psychiatry, Founded in 1874

CELEBRATION OF THE THIRTIETH ANNIVERSARY OF THE PHILADELPHIA NEUROLOGICAL SOCIETY

FRIDAY EVENING, NOVEMBER 27, AND SATURDAY EVENING, NOVEMBER 28, 1914

SCIENTIFIC MEETING

Cadwalader Hall, College of Physicians, Friday Evening, November 27, 1914, at 8:15 o'clock

1. Charles K. Mills, M.D., Presidential Address: Concerning Cerebral Morphology in its Relation to Cerebral Localization.
2. Francis X. Dercum, M.D.: Nervous and Mental Diseases and the Newer Pathology.
3. James Hendrie Lloyd, M.D.: The Morphology and Functions of the Corpus Striatum.
4. Charles W. Burr, M.D.: The Psychology of Misers.
5. William G. Spiller, M.D.: Remarks on the Central Representation of Sensation.
6. Theodore H. Weisenburg, M.D.: The Founders and Work of the Society.

CONCERNING CEREBRAL MORPHOLOGY IN ITS RELATION TO CEREBRAL LOCALIZATION[1]

By Charles K. Mills, M.D.

PROFESSOR OF NEUROLOGY IN THE UNIVERSITY OF PENNSYLVANIA; NEUROLOGIST
TO THE PHILADELPHIA GENERAL HOSPITAL; PRESIDENT
OF THE PHILADELPHIA NEUROLOGICAL SOCIETY

Reminiscent—Morphology in the Early History of the Society

. This society organized in 1884 has made for itself a place in the history of American neurology. During thirty years it has never failed to meet at the appointed time. Its proceedings record much of the valuable neurological work, both actual and suggestive, of this period. As other decades roll on I have no doubt that it will continue to maintain its position. On behalf of the society I wish to extend our welcome and appreciation to those not of our membership who honor us with their presence this evening. This society has played a chief part in the building of what has been often spoken of in terms of compliment both here and abroad as "the Philadelphia school of neurology."

I have found the choice of a subject difficult and the necessary restriction as to time in presentation somewhat hampering. Two courses seem open, one, to give the results of a special line of neurological investigation, and the other, to present a subject of general interest, like cerebral morphology, referring among other things to the past work of the society in this field. I have deemed it best to choose the second of these courses and am more willing to do this knowing that several of my colleagues on the program this evening will give especial attention to the recording of the results of personal research. It is also somewhat the fashion for presidential addresses to deal with subjects of general interest.

On an anniversary occasion like this, one who has dwelt with

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[1] Presidential address at the celebration of the thirtieth anniversary of the Philadelphia Neurological Society, delivered at the scientific meeting held Friday evening, November 27, 1914.

the society since its birth naturally turns back to the early period of its scientific history. Morphology was then one of the subjects especially interesting to some of our small band of neurological workers, among these being Dr. Andrew J. Parker who has passed from our midst and Dr. Francis X. Dercum who is fortunately still with us, fruitful in work.

My own attention and interest were fixed by the questions of cerebral surface topography, especially as illustrated in arrested, or aberrant fissures and gyres in the Caucasian brain and in the brains of other races as in the Negro and the Chinese. I have thought that lured by old memories and stimulated by recent tendencies in neurological research abroad, the subject of cerebral morphology in its relations to cerebral localization might prove of interest.

In our society and in the country at large, cerebral localization has been chiefly advanced by experimental physiology and clinico-pathology. A multitude of experimentalists have sought to locate functional centers and areas by focal extirpations, ablations, local freezings, and electrical excitation. Cerebrum and cerebellum, cortex and ganglia, grey matter and white, have been questioned with more or less success by these methods. Clinical medicine and neuro-pathology have had the most contributors. The symptomatology of circumscript lesions, the projection, commissural, and association systems of the cerebrum, the cerebellum, and the basal ganglia, cerebral and cerebrospinal mechanisms,— these and other localization subjects have received the attention of our society. A critical examination, however, of the work done shows that omitting the first lustrum of our history to which I shall presently refer a little more at length, morphology, both macroscopic and microscopic, has been largely neglected.

As a society we would be furthering the best interests of neurology if our work were turned in larger degree to those morphological fields which are being tilled with such fruitful results by some of our confrères abroad.

Morphology is the science of organic form. In a broad sense it treats both of outer form and internal structural arrangement. While morphology in this fundamental meaning does not deal with function, the development of function in the organism receives its first and best elucidation in the study of anatomy and morphology. It is not so much that the form determines the function as that

the form is largely determined in the process of development by
the function or intrinsic characteristics of the parts.

In strictness some of the data and inferences of this address
may have reference as much to anatomy as to morphology, as it
is not always easy in exposition to separate these two branches of
biology.

Van Valkenburg (26) has well presented some of the most
important principles which should guide us in the use of mor-
phology as a groundwork for a doctrine of cerebral localization.
As he indicates, the dividing lines which separate cortical local-
izations can be regarded in the first place as vertical to the cortex
and in the second place as running parallel with it. The vertical
lines of demarcation are represented by the fissures, and the
parallel subdivisions by the cortical layers and strata. The two
leading features in any fundamental scheme, on the one hand,
are to be found in a discussion of the cortical areas bounded by the
fissures demonstrably of functional importance, and on the other
by a consideration of what is separated into circumscript regions
by the cellular groupings in the strata or layers. Investigation of
the subject from the morphological point of view therefore be-
comes a study of the place and plan of development of the fissures
and their environing cerebral substance, and of the cyto-architec-
ture in different locations of the parallel strata or layers of the
cortex.

The first paper presented to this society at its first scientific
meeting held in 1884 was one by me recording the history of
the case of a murderer who was executed in this city, the con-
tribution including an account of the fissural and gyral aberra-
tions presented by the brain of this criminal. At the second
meeting held on March 24, 1884, Dr. Andrew J. Parker made a
verbal contribution on " Certain Primary Fissures of Fetal
Brains," and at a later meeting after having studied with me the
brain of another criminal, he described it before the society with
some discussion by myself and others of its atavistic peculiarities,
the brain being more remarkable in some of its reversions than
any that have been published before or since.[2]

[2] During the delivery of the reminiscent and historical portion of the
address charts were exhibited showing reproductions of photographs of a
Chinese brain and the brains of several criminals and for comparison
those of several eminent biologists described by E. A. Spitzka (25). Il-
lustrations of the surface topography of the brains of lower and higher
primates from drawings and photographs taken from the monograph of
Parker were also exhibited.

Dr. Andrew J. Parker, a Philadelphia Morphologist

Let me now call attention at some length to the personal history and to the main work of Dr. Andrew J. Parker (22), the distinguished cerebral morphologist who contributed to our early proceedings, feeling that to do this may not be without interest and value as it has always appeared to me that his work has not received the recognition which its merit deserves, that it has in fact to some extent been treated with unwarranted neglect.

Parker, who was born in Philadelphia and who was a graduate of the medical school of the University of Pennsylvania, early exhibited unusual interest in zoology and comparative anatomy and showed especial ability in the study of cerebral morphology. He was a favorite student of our greatest anatomist and biologist, Dr. Joseph Leidy. His one enduring contribution is that on " The Morphology of the Cerebral Convolutions with Special Reference to the Order of Primates." This was published by the Academy of Natural Sciences of Philadelphia in 1896, after his death which occurred in 1892. The fund required for this publication was contributed by his friends, the movement to bring this about having been initiated and carried forward by Dr. Dercum. The studies on which the paper was based were begun as early as 1877. Additions, extensions, and elaborations of his observations and theories were made until they assumed the form of the monograph as it was published by the Academy. The paper was awarded the Boylston prize by Harvard University in 1890. It is beautifully illustrated from original photographs and drawings by the author.

Let me here recall in summary a few of the main features of Dr. Parker's morphological monograph. He shows that only three conceivable theories can be advanced to account for the cerebral elevations and depressions. The first of these is the mechanical theory. According to this, the brain growing and developing with more rapidity than its bony environment, is necessarily thrown into folds and furrows in order to accommodate itself to this environment. This mechanical theory accounts for some of the fundamental primary fissures, as for instance, the fissure of Sylvius. According to the second view, the fissural and gyral development and arrangement depend upon a genetic principle. The third view, which is adopted by Parker, is a combination of both. According to this, certain of the fissures and

convolutions including the most important, are produced by merely mechanical causes, whilst others owe their origin to morphological processes of growth in the brain substance itself, the fissures representing lines of retarded and the convolutions of increased growth.

Starting with the idea of the development of the brain from the usually accepted cerebral vesicles, Parker shows that the cerebral hemispheres develop a hollow ovoidal body connected with the thalamencephalon, which body is arranged after a triradiate plan. This foreshadows the future lobes of the hemisphere. He distinguishes only three lobes, an anterior, an inferior, and a posterior. The anterior he terms the occipitofrontal lobe, which he describes as arching forward and descending to the position of the cerebral crus above. The second lobe, which he calls the occipitotemporal, arches downward and forward beneath the crus. The third or occipital lobe, passes directly backward. In other words, these three lobes are related respectively, one to the lateral ventricle and anterior horn, the second to the middle horn, and the third to the posterior horn. The arrangement is on a symmetrical triradiate plan, the fissure of Sylvius separating the parts anterior. He does not regard the insula as morphologically related to the other lobes of the hemisphere. Carrying out his hypothesis and in explanation of the entire morphology of the cerebral hemisphere, he believes that " the fissures and convolutions of the cerebral cortex are related in a regular and symmetrical manner to these hollow triradiate hemispherical bodies."

The first great triradiate fissuration is produced by a mesal arched fissure which divides into a superior or callosal portion enveloping the anterior horn and the lateral ventricle, and an inferior or hippocampal portion which corresponds to the middle horn, these being connected with the calcarine fissure which is the ectal correlative of the posterior horn. This triradiate fissuration occurs early in fetal life.

According to Parker the primary or typical fissures of the primate brain are the Sylvian fissure or fossa and the above described mesal arched fissure which consists of the callosal hippocampal and calcarine fissures. These fissures form the fundamental or plan fissures upon which the convolutions of all primate brains are based. They are not only the first to appear in the

development of the human brain and in all other primates, but they have also definite relations to the hemisphere itself. All of the other fissures and convolutions, according to Parker, are related in a definite manner to these primary furrows.

He holds that toward the end of the fifth month with the exception of the Sylvian fissure, the lateral aspect of the fetal brain is smooth, but on the mesal aspect the great fundamental triradiate fissure which is to dominate the future morphology of the entire cerebral surface is well developed. He differs from those who precede him and from his contemporaries in not according to other great fissures a similar importance. From his point of view the central, the intraparietal, the parallel, the first frontal, callosomarginal, and even the parieto-occipital fissure may be regarded as secondary, although the last has a special significance.

At an early date, about the third month of fetal life, the fissure of Sylvius divides the cerebral hemisphere into two lobes. In this fossa, broad at first, appears the insula. By the development of the temporal and especially of the frontal operculum the fossa is gradually closed in so that about the time of birth it is only a fissure, although even then the island of Reil is slightly exposed.

Parker's studies covered particularly the fetal brain, the brains of primates, and the negro brain. In the negro brain he found the insula usually more or less uncovered. In the brain of the white human being it is usually covered. The uncovering of the insula is not a characteristic of the brains of primates below man, or of man himself except in the case of the negro.

Shortly after the appearance of the mesal arched fissure, and in connection with the formation of the occipital lobe, the calcarine fissure appears as a nearly horizontal branch of the mesal arched fissure.

Parker divides the occipital from the parietal lobes by the internal and external prepeduncular fissures of the ape, or what correspond to them. He shows how, on the external and on the mesolateral surface of the hemisphere fissures more or less well and ill defined, demarcate this lobe. One part of this fissuration corresponds to the occipitoparietal fissure, the other to what is known as Wernicke's fissure which is often seen well outlined in low type human brains some of which have been described by me.

The parieto-occipital and Wernicke's fissure constitute for Parker the "occipital arch."

Parker divides the occipitotemporal lobe into four convolutions by means of three fissures, the first arching around the posterior extremity of the Sylvian fissure and the second around the same extremity of the parallel fissure, these being the well known first and second temporal convolutions. The third and fourth convolutions as regarded by Ecker, he seems to consider as one. He shows what is well known, that the longitudinal fissural differentiation is not clear between Ecker's third and fourth temporal convolutions. Parker's fourth occipitotemporal convolution consists of the union of the lingual and hippocampal convolutions. These fissures and convolutions bear certain distinct relations to the occipital lobe.

Describing the mesal surface of the hemisphere, Parker speaks of what he calls the midoccipitofrontal fissure which corresponds in large part to the callosomarginal fissure. He does not however regard it as stopping at the usual position according to the descriptions of Ecker and others, that is, at the posterior boundary of the paracentral lobule, but believes that it should be considered as extending backward until it meets the primary occipital arch on the mesal surface. It is true, as he says, that in many human brains an H-shaped triradiate fissure is to be found in the precuneus, and this or a portion of it he regards as a continuation of the usually accepted callosomarginal fissure. He also points out, what I have observed, that the callosomarginal as usually accepted sometimes breaks up into two or more parts. This middle occipitofrontal fissure therefore follows in an archlike manner closely the course of the medial occipitotemporal fissure, and it and the convolutions bounding it develop according to Parker, on the same morphological principle as the latter fissure. The gyrus fornicatus, convolution of the cuneus, and hippocampal convolutions which together constitute the limbic lobe, form an arched convolution or series of convolutions following largely the course of the mesal occipitofrontal and mesal occipitotemporal fissures.

Parker does not regard the central or Rolandic fissure as a primary or fundamental fissure, like his triradiate fissure or the Sylvian fissure. It is, if all the primates be considered according to him, not as constant as the primary occipitotemporal fissure (first temporal or parallel fissure). It is absent or only slightly

represented in some of the lower forms of primates, but becomes more and more important as the scale is ascended and is usually defined and constant in the anthropoids and in man. In the latter it affords one of the best landmarks.

CRITIQUE OF PARKER BY DR. KAPPERS

I sent a copy of Dr. Parker's monograph to the eminent Dutch anatomist and morphologist, Dr. C. U. Ariens Kappers, director of the Central Institute for Brain Research, Amsterdam. Dr. Kappers made a careful study of the volume and with much courtesy wrote me two letters giving in condensed form the results of his study. I append one of these with a few unessential omissions in which Dr. Kappers, while criticizing some of the positions taken by Parker, shows his strong appreciation of our former colleague.

AMSTERDAM, September the 25th, 1914.

Dear Prof. Mills,—

Since my last letter to you I have continued to read Parker's paper and have now finished this lecture.

I am glad to have studied it again and more carefully than I had done, when preparing my report. I am much indebted to you that you have again called my attention to it. It is worth studying carefully.

Allow me to give you my impression of it and my criticism in the following lines:—

1. Concerning the transitory furrows as depicted in Parker's Fig. 2, p. 281, I believe with Hochstetter, Mall, Elliot Smith and others that they are artefacts. I have never seen them in my large collection of fetal brains, nor in fresh condition, nor after good fixation. It is not strange that especially these furrows— when they are formed, after a diminution of tension or putrefaction of the brain, should exhibit a mathematical arrangement, since they are dead lines not living lines. That in less good material a form as Fig. 2 can occur, is a fact which I could see in old preparations of the anatomical museum of our university. We may not however ascribe to them a fundamental character.

2. That fissures can be formed in regions where the presence of ventricles directly underneath the pallium diminishes the resistance is also my opinion and I would quote the same examples which Parker quotes, p. 288.

3. Parker's opinion about the cause of formation of the Sylvian fissure is also my opinion, especially Manatus Americanus is a striking proof for the fact that the brain-wall of the insula is fixed on the striatum by the number of fibers that pass through

the capsula interna and this fixed region is then vaulted over by
the protruded frontal, parietal and temporal brain-walls.

4. Concerning the primary occipital arch (see Parker, p. 293
and further) I may remark that this conception holds good for
the Simiæ.

Whether the simian fissure or perpendicularis externa of the
simian brain may however be homologized with the perpendicu-
laris externa sometimes occurring in human fetuses of the 6th and
7th month is doubtful.

There seems to be a good chance that the perpendicularis ex-
terna of such human fetuses is a product of impression of the
sutura lambdoidea (hence Wilder's name "fissura lambdoida").

The simian sulcus or perpendicularis externa of apes may
however occur also in adult man, as has been decisively proved
by Elliot Smith. Prof. Davidson Black from Cleveland, who
worked in my laboratory last summer, will publish soon a striking
example of it.

5. I do not believe that Parker's primary occipital arch has
anything to do with the transitory furrows of Parker's Fig. 2.

6. It may be true that in those animals, where Parker's sec-
ondary occipital arch (the Y-shaped fissure of Elliot Smith)
occurs, this is a "vegetative reproduction," as he calls it, of the
primary occipital arch; a repeated result of the same pressure-
forces which caused the primary occipital arch. This would also
explain why it occurs very rarely in man in a typical form, since
also the primary occipital arch is rarely complete in man.

7. It is very interesting that Parker, p. 306, is inclined to
derive the fissural system of the lateral convexity from horse-
shoe-shaped fissures round the fossa sylvii. This principle has
been proved to be right and is also used by Holl, Elliot Smith
and myself. The three last named authors came however to a
deduction different from Parker's. Starting from Carnivora
(special Felidæ or Canidæ) we see in Ursidæ that the first lateral
arch, the ecto-Sylvian fissure, has entirely disappeared in the
insula, the first arcuate convolution forming something like the
gyri longi insulæ in human anatomy.

In another carnivorous animals, Lutra vulgaris, we find some-
times the next process; the concealment of the anterior limb of the
suprasylvian fissure (second lateral arch) and the anterior limb
of the second arcuate convolution in the insula so that only the
posterior limb of the suprasylvian fissure and of the second ar-
cuate convolution remain on the surface forming the postsylvian
fissure or fissura temporalis superior delimiting the temporal con-
volution. You find this process illustrated after drawings from
nature (no scheme) in Fig. 5 of my London report.

The statement made by Parker that the intraparietal and in-
ferior postcentral are derived from this arch is wrong (see
Parker, Figs. 11 and 12, p. 306). You know yourself that the

intraparietal and inferior postcentral are never or very rarely connected with the temporalis superior.

In Carnivora as the Felidæ and Canidæ the third arched fissure is formed by combination of the coronalis (with ansata) and lateralis. From the coronalis and the ansata the central sulcus is derived and from the lateralis and its additional sulcus the medior postlateral, the intraparietal (with inferior postcentral) and the lunate or simian sulcus are derived. Parker has committed a mistake, I believe, in deriving the frontalis inferior from the anterior limb of the suprasylvian fissure and the frontalis superior from the anterior limb of the coronal fissure, but he is right in deriving the central from the coronal (plus ansata). My deductions concerning this point are found in my English report (Fig. 6).[3]

The frontalis inferior with the precentralis inferior is probably a derivative from the presylvian fissure of Carnivora and the frontalis superior is a new thing in the primates.

As far as concerns his mathematical conclusions I agree with Parker in the importance of Plateau's laws for the constellation of sulci. I believe however that though mechanical conditions have a considerable part in the formation of several sulci (calcarina, fissura hippocampi), a marked tendency to adapt themselves to functional (intrinsic) qualities of the cortex can be found in most of them. . . . I remain

Most cordially yours,

C. U. Ariens Kappers.

P.S.—I will not omit adding that the reading of Parker's paper is a pleasure. The great knowledge of literature exhibited therein, the "causal thinking" (das causale Denken) which is so obvious on all the pages, then the broad viewpoint from which he considers these formations make his book stand out like a fertile piece of land between the sandy and incoherent literature on fissuration, which forms the greater part of communications on this subject.

Some American Morphological Observations

I may be permitted at this point to say a few words additional about work done in cerebral morphology by Americans since the organization of our society.

To Professor Burt G. Wilder (27, 28) of Cornell University, Ithaca, N. Y., and to Professor Edward Anthony Spitzka (25), a highly gifted member of our own society, probably more than to any others either here or abroad is due the credit of emphasizing

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[3] A little part of the most frontal division of the anterior limb is perhaps represented by the sulcus opercularis, fissure Sylvius in apes.

the importance of studies in cerebral surface morphology as represented in high type human brains.

In my presidential address (15) at the meeting of the American Neurological Association held in Long Branch, June 21 to 23, 1886, I directed attention, with photographic and other illustrations, to the subject of the arrested and aberrant development of fissures and gyres in the brains of paranoiacs, criminals, idiots, and negroes. In the same address was incorporated a preliminary study of a Chinese brain, this investigation having been made in collaboration with Dr. Parker. In a journal known as *The Philadelphia Polyclinic*—at that time (September, 1886) the bulletin and organ of the post-graduate institution of the same name—I published an abstract of this address together with additional photographic illustrations of the brain of a criminal. This brain was one of the most remarkable ever studied by me.

My own observations on high-type human brains have been very few, one of these being made from photographs of the brain of Professor Alexander Winchell (17), the distinguished geologist, educator, and scientific author. In the morphology of his cortex one would look for the representation of high intellectual powers. Both his posterior and anterior association areas, so-called, fully carried out this expectation.

In my paper on Cerebral Localization in its Practical Relations (16), presented to the first Congress of American Physicians and Surgeons held in Washington in 1888, I called attention to the fact that it was important to remember the morphological variations and peculiarities in the human brain, especially in the posterior association area of Flechsig, when fixing the site for operation on the basis of symptoms presumably referable to lesions in this region, giving a number of instances of striking deviations from the usually accepted fissural and gyral pattern in human brains which had fallen under my observation.

Morphological Topics of Special Interest

Turning now to a study of the recent literature of cerebral morphology, let me bring to your notice several topics of special interest, namely,—(1) the significance of the fissures of the cerebrum and their relation to certain intrinsic localizations; (2) the process of tropism designated by Kappers as neurobiotaxis; (3) the value of cyto-architectonics in the study of localization; (4)

the histological anatomy and morphology of the basal ganglia especially of the thalamus; (5) the fissural and gyral morphology of the cerebellum; (6) cerebral anatomy, morphology and localization in their relations to mental disease; (7) the question whether cerebral centers so-called do in reality fully represent bodily functions; and (8) the anatomical and morphological material at the command of the society.

The Physiological Significance of Cerebral Fissures

Early in my morphological and localization studies I was impressed with the idea that the cerebral fissures or at least some of them were probably the boundaries of functional areas, arriving at this conception among other ways from a consideration of the atavistic peculiarities of low-type human brains, and the great difference easily discernible between these and the few examples of brains of individuals of higher intellectual capacity which I had opportunity to study either directly or in the literature of the subject. These low-type brains showed among other things, ape-like fissural reversions and tendencies to fissural confluences and the submersion of annectant gyres. The region of junction of the occipital, parietal and temporal lobes, which forms in its enlargement the posterior association area of Flechsig, was as strikingly simple in its fissural and gyral pattern as the same region was found enlarged and elaborated in the brains of men distinguished in various walks of life. The same relative simplicity and atavistic tendencies were found more or less defined in the midfrontal and prefrontal lobes, including the region of Broca.

Such observations while not sufficient for accurate localization determinations, were steps in this direction. They were helps toward a confirmation of the conclusions reached by Spitzka (25) in his interesting and important investigations. Speaking of the brains of distinguished men, convolutions according to Spitzka were found to be sometimes more massive, sometimes much convoluted; the subfrontal (third frontal) gyre was of unusual size and development; or this unusual development was observable in the frontal and parietal lobes. It was noticeable however in Spitzka's investigations that in some instances the brains of these distinguished men, instead of being very complex, were of unusual or comparative simplicity. Observations such as these, Spitzka correctly holds, point to the fact that much more than the mere

surface morphology of the brain must be taken into consideration in arriving at conclusions as to the value of lobar, gyral, and fissural markings and development, and that the quality of the cortex as indicated by histological research, and the amount, number, fineness or coarseness of the white fibers of the brain, are not to be lost sight of in our inferences.

Many of my own clinico-pathological observations recording focal lesions have seemed to me to indicate the boundary values of fissures, especially those of large size and depth. More than a quarter of a century ago I became pretty well satisfied that the central fissure was the boundary between the area for common and muscular sensibility and the motor region, expressing this view as early as 1888.

It is now very generally recognized that the central fissure forms this boundary. Similarly studies of actual cases with careful necropsies have seemed to me to indicate the frontier values of such fissures as the parallel, the Sylvian, the ascending Sylvian, the intraparietal, the calcarine, and even others of less size and extension like the precentral, the callosomarginal, and the retrocentral. But this is a subject which can be properly elucidated only by elaborate consideration with the supporting data.

SIGNIFICANCE OF CEREBRAL FISSURES AND THEIR RELATION TO INTRINSIC LOCALIZATION (KAPPERS)

In the remarks which immediately follow I wish to call the attention of members of the society to some phases of the work of C. U. Ariens Kappers, of Amsterdam, doing this because of the intrinsic interest and great value of the researches of this distinguished Dutch anatomist and morphologist. The two lines of investigation of Kappers to which I shall confine myself are those relating to the significance of fissures and the doctrine of neurobiotaxis.

Unquestionably one of the most valuable recent contributions to fissural morphology is the paper contributed by Kappers (8) to the Jubilee volume of Le Névraxe (Vol. XIV, 1913), dedicated to M. A. van Gehuchten, professor at the University of Louvain, on the occasion of the twenty-fifth anniversary of his professorship, on "The Significance of the Fissures of the Cerebrum in General and their Relation to Intrinsic Localizations in the Insular Region and in the Frontal Lobe."

Kappers first refers to the fact that Owen, Baillarger, Gratiolet and others had previously pointed out the difference between the abundance or number of convolutions in animals with larger and smaller brains (cerebrums). He uses his illustrations[4] to show especially the greater convolutional development of brains of larger size. Calling attention to the law of Baillarger, that volumes of similar bodies are to each other as the cubes of their diameters, while their surfaces are to each other as the squares of their diameters, he shows that this law is modified when cerebral surface and cerebral volume are in question by the fact that the brain surface is thrown into fissures and folds. As in the main the thickness of the gray matter and its relation to the volume of the brain remain without much change, it becomes necessary that the cortex should be increased by the infolding of the surface in order to obtain a larger cortical area in animals of increasing size and importance.

Kappers differs with Jelgersma's idea that there is another explanation to be given, namely, a diminution of the white matter, which does not suffice to fill the pallium. He notes that, on the contrary, Brandis and Ernst de Vries have proved that the white matter of the cerebrum increases more in proportion to volume in large brains than does the gray matter.

Kappers shows that the law of Baillarger is modified in the ascending evolutional series by the changes, displacements, and elaborations of the fissures, with the concomitant necessary alterations in the gyral masses related to these fissures. A study of Kapper's skilfully prepared chart shows the manner in which with increase of size and evolution of the intrinsic characteristics, these brains exhibit more and more fissural changes and elaborations.

Turning to the insula and its environment Kappers shows with convincing data that "the impartial comparison of the fissural and intrinsic qualities of the insular cerebral system teach us that there exists between them an evident parallelism of great importance and that the displacements of the fissural fields are not merely superficial changes, but they furnish interesting indications regarding the displacements in the mass of the cortex where the cerebral functions reside."

[4] In illustration of this address a chart was exhibited, reproduced by permission of Dr. Kappers, this showing the difference between the convolutional and fissural development of animals with brains greatly varying in size.

Taking up the study of the fissures dorsad to the Sylvian fossa, Kappers then discusses the coronal, the pre-Sylvian, the ansata, etc. He shows how these develop in the ascending scale, changing position, form, size and connections. The coronal and ansata united correspond to the central in the ape. The frontal lobe develops step by step with the development and displacements, severances and unions of these fissures. This growth and development are due especially to the pre-Sylvian and not to the precentral field.

" More than is the case in the lower apes," he says, " the frontal lobe of the anthropoids and man—especially the part situated in front of the pre-Sylvian or precentral fissure—is excessively developed in comparison with other parts of the brain, and it probably contains fissures whose analogue does not exist in the lower apes. This summary suffices to corroborate our opinion that a submersion of a large cortical part in the insula must be explained by the enormous development of the frontal brain, especially of the field situated in front of the sulcus arcuatus, or its descendant, the inferior precentral fissure, the pre-Sylvian field."

Limiting his studies to the ungulates, carnivora, prosimians and man, Kappers brings out two facts,—the involution of the insular region, and the increase of the frontal lobes. As regards the former he confines his studies to the brains of apes and man, because he believes that he can best determine facts regarding such involution in these mammals.

He finds that in the animals below the primates, the Sylvian fissure has such heterogeneous variations that as compared with the primates one may speak of it best as a pseudo-Sylvian fissure. Three fissures constitute an arch around the Sylvian—the supra-Sylvian, the ecto-Sylvian, and the corono-lateral system. As evolution goes on this Sylvian field soon disappears from the exterior surface of the brain.

In the carnivora the ecto-Sylvian fissure becomes submerged in an increasing pseudo-Sylvian fissure, the convolutions also undergoing a similar involution. The supra-Sylvian fissure also undergoes submersion and changes in fissuration. The posterior part of the supra-Sylvian fissure which escapes submersion becomes the superior temporal fissure. At the same time, as evolution progresses the fronto-parietal portion greatly increases along the Sylvian fissure, becoming more and more opercularized.

In apes an orbital fissure is seen passing into the opercular region, and the insula begins to appear, but unlike the condition in man it is not covered. In brief, the study of the fissures and of the morphological characteristics of the brain shows a successive submersion and displacement of the furrows in the lateral region.

The question next studied is whether the intrinsic qualities of the frontal lobe show a parallelism with its fissural and general evolution.

Kappers recalls that the studies of such observers as Hitzig, Ferrier, Vogt and others indicate that in the carnivora a special localization of the movements of mastication, of the face, the eyelids, the head, etc., bears certain relations to the coronal and ansatal fissures. As the series is ascended the localization is still present, but is more discoverable nearer to the central fissure. The central fissure in other words now forms more exactly the posterior boundary than the ansatal and coronal fissures in the lower orders.

Electrical experimentations, says Kappers, confirm the opinion that the pre-Sylvian fissure corresponds to the arcuate because these two fissures form the anterior wall of the motor field of the head. In the anthropoid a nonirritable section is found in the neighborhood of the inferior pre-central fissure between this fissure and the true motor area which is further back toward the pre-central fissure. The chief electrically irritable field is along the central fissure.

Kappers further cites the evidence of secondary degenerations in favor of the theory of the motor field being entirely cephalad of the central fissure, as against former views that it was partly in the post-central region.

Evidence from the cyto-architecture of the frontal lobe confirms the fissural homologies and maintains the position that the intrinsic characteristics of the parts are related to fissural changes and displacements. The cortical layer in the ungulates which is limited by the coronal and ansatal fissures is almost confined to the agranular type. The internal granular layer (IV) is no longer seen but there is an abundance of pyramidal cells. Brodmann calls this field the pre-central agranular area. The characteristic cells in this region are the giant cells of Betz from which originates the pyramidal system of fibers. In the sheep this re-

gion extends as far forward as the pre-Sylvian fissure or nearly to it. Laterally it extends a little beyond the coronal fissure.

The very small part of the frontal lobe situated between the pre-Sylvian fissure and the sulcus rhinalis anterior which has a granular structure, does not belong to the pre-central region, but forms part of the frontal granular region in the primordial state.

In the carnivora, ascending in the scale, this pre-central region differs from that of the ungulates in that it extends more laterally (dorsally) even crossing at times the ansata in some carnivora like the cat and the bear. The field now begins to take a position which is more dorso-lateral and more oblique.

As we pass up in the carnivora the coronal fissure ceases to be the exact wall of the agranular pyramidal region, the motor field developing dorso-laterally to the fissure, not following it closely as a boundary. The pyramidal bundle arising from this new field is now more fully developed in the carnivora than it was in the ungulates. One dominating fact remains that the field has changed its position in relation to the sulci.

Summarizing his morphological facts, *Kappers finds that the results correspond with the data and conclusions of physiology, hodology, and cyto-architectonics. In the first place is noted a considerable enlargement of the frontal brain in phylogenesis. This enlargement is not due merely to the increase of the pre-central region in general, but especially to the expansion of that area situated in front of the pre-Sylvian, that is of the pre-Sylvian field of the frontal lobe.*

The learned anatomist of Tübingen, Brodmann, therefore is right according to Kappers, in dividing the frontal lobe into two parts, a pre-central properly socalled, and cephalad of this the frontal region. The latter is in the main what is usually regarded as the mid-frontal and prefrontal regions of the frontal lobe.

Kappers concludes that if it is true that the identity is not complete, if fissures must not always be considered as the limits or axial lines of the characteristic fields, the studies on fissural homologies are valuable enough to cause us to hope that morphology will continue to enrich us.

A general conclusion to which Kappers directs attention is that the cortex instead of increasing in thickness rather extends itself as a surface and therefore in order to maintain the original proportion between cortex and volume, takes numerous folds.

This is true even when we consider the question of stratification in its relation to function. The layers or strata which constitute the cortex increase with equal steps with the outside layer or extreme surface. If we look upon the question of function in its cellular relations, the same law holds good. The increase of the strata of the cortex through the process of gyral and convolutional development gives more room for cells of the kind which are needed for the functions acquired.

Kappers combats the idea that vascular relations, as has been held by many, determine the position of the fissures. While large vessels may follow the lines of fissures of considerable extent, and vessels may have a general tendency to follow fissural arrangement, we do not find these vessels placed at the bottom of the fissures, as would be likely if vascularization determined the position of the gray matter within these fissures. In the case of the cerebellum numerous fissures run transversely, while the great vessels pass longitudinally.

Summarizing his contemporaries, Kappers shows that Bolk, Kohlbrugge, and Stieda consider the sulci as regions of feeble growth. " Broca, Cunningham, Hill and Bolk presume that the sulci have a veritable physiological significance in that they delimit regions endowed with different functions. Ziehen likewise considers the sulci as arising from an intrinsic function of the cerebrum, but adds that they do not always follow the localizations. Campbell (4) and Vogt admit the possibility of an intrinsic homology, which however is never complete. Elliot Smith believes that the sulci were originally the limits (rhinalis, pre-Sylvian, supra-Sylvian, calcarina, anterior), or axial lines (fissura hippocampi, retro-calcarine), or areas of different function, but that the primitive character is effaced in consequence of cortical complications by associative centers in the sense of Campbell."

In other words, this last view is that while primitively the sulci may delimit areas of special function, an entirely homologous sulcus in a different animal may, because of special development, not so limit the primitive functional area. Brodmann holds that the cytoarchitonic structure of the cortex indicates that the sulci do not give exact localizations, although he agrees in a general way with the view of the fissural separation of functions. He believes that the effort to force these homologies into the service of the theory of structural centers is fruitless.

Neurobiotaxis (Kappers)

A clear understanding of what is meant by that process of tropism which Kappers (7) has designated as *neurobiotaxis* gives a clew which can be obtained in no other way, as to the localization of cellular groups endowed with special functions. The principle underlying the arrangement and distribution of nerve cells and their processes, axones and dendrites, is one that has fixed the attention and attracted the close consideration of some of the most distinguished histologists of recent times and especially of His, Sr., and His, Jr., of Held, Ramon y Cajal, and C. U. Ariens Kappers. Some of the questions arousing interest are the following: what determines the direction taken by axones and dendrites in the process of growth and development? In other words, in what manner are cellular combinations accomplished and what determines the direction of commissural association and projection tracts? What are the laws governing the developmental arrangements of the nervous system? What is the basis of the organic form of special parts?

" I have used the term neurobiotaxis," Kappers says, " on account of its being a process of taxis or tropism occurring under normal conditions of nervous action, that is under the influence of reception and propagation of stimuli."

So far as I have knowledge of the subject, until the publication of the work of Kappers most attention was given to the question of the direction taken by axones and dendrites, by the processes of the cell in other words. His, Sr., regarded axones as taking their course along lines of least resistance, but this has seemed to me, as to Kappers, an explanation which does not explain.

Ramon y Cajal on the basis of an extraordinary amount of personal investigation arrived at his doctrine of chemotaxis. According to Cajal axones, dendrites, and collaterals grow as the result of the action of some chemical substance in the nervous system, taking this or that direction in obedience to this influence or by virtue of this influence in accordance with the irritations or stimuli from parts outside.

Kappers directed his attention to the question of the displacement of cell bodies as exhibited especially in the cell groups which

constitute the nuclei of the motor cranial nerves.[5] Referring to his series which includes reptiles, amphibia, birds, etc., to man, Kappers shows how the cranial motor nuclei undergo a series of displacements, brought about through differences in the stimuli exerted on these motor cell nests by the sensory ganglia or nuclei. The motor nuclei are displaced to positions more dorsal or ventral, more cephalic or caudal, or to positions which are combinations of these caudal, cephalic, dorsal and ventral directions, and all in obedience to the changing and augmenting stimuli which are essential to the physiological processes characteristic of the species of animal under consideration. The general conclusion is that shiftings and displacements of the cranial motor nuclei are caused by differences in stimulation. This law is probably equally applicable to the positions taken by axones and their collaterals, by dendrites, and by the cell bodies themselves. Kappers believes that this neurobiotactical factor is found in the arrangement of the sympathetic system, while Cajal and Van Valkenburg see its influence in the arrangement of the granular layer of the cerebellum, and according to Herrick it can be equally traced in the architecture of the forebrain.

It is probable that when the facts of neurobiotaxis are thoroughly worked out for all parts of the cerebrum, it will be found that the motor areas have taken their position and form in close correlation with the sensory centers from which they receive their most important stimuli. It will be recalled by some members of the society that in one of my papers describing a new scheme of the zones and centers of the cerebrum, I expressed the conviction that every cortical sensory area so-called had closely related to it in position a motor cortical area for that particular sense; in other words that there is a visual motor, an auditory motor, a gustatory motor, an olfactory motor, and preëminently a cutaneomuscular motor area. The last is the main cerebral motor area, that to which we usually restrict the term motor region. In other papers also I have argued that the cutaneo-muscular sensory area encircles, so to speak, the main motor region, and that it has subdivisions each of which is correlated with the subdivisions of the motor region itself,—a sensory subarea for the face, the head, the

[5] In illustration of the subject of neurobiotaxis a chart was exhibited through the courtesy of Dr. Kappers showing the migration of motor nuclei in vertebrate evolution.

upper extremity, the trunk, the lower extremity, and probably for oral and visceral parts.

Cytological Anatomy and Morphology

An investigator who has made important contributions to cytological morphology is Mott (21). One point in his work is salient,—that as vision advances, increase in the development of the pyramidal cells takes place. In the race and in the individual, development of the pyramidal cells both in number and size, increases step by step with the evolution of power. Mott refers to the well-known myelinization views of Flechsig, especially with reference to the optic radiations and the development of different layers of the visual cortex. The intermediate zones of Campbell (4) are but other names for the association areas of Flechsig. In the visual cortex the intermediate visuo-psychic area is the optic memory field of Wilbrand and Saenger.

In one of the charts exhibited to illustrate this address I reproduced from the work of Brodmann (3) a schematic representation of what this investigator believes to be the approximate distribution of functional areas in accordance with the results of his extensive studies on the cytology of brains of different orders of mammals including man. These results as here schematically depicted are largely, but by no means entirely, in accordance with those obtained by other methods of research. In this connection will be remembered the work of Campbell regarding the location of motor, sensory, and other areas as determined by cyto-pathological investigations.

In a general way the histological investigations of Campbell show that the posterior association area of Flechsig, the concrete concept area of the writer, is subdivided into subareas for the representation of concrete memories, those memories which are derived primarily by way of common sensibility and special sensation; they are, in other words, higher areas of vision, audition, common sensibility, olfaction and gustation.

Brodmann's results were not in all instances approved and corroborated by Ariens Kappers (9) who has written an admirable critique of the work. On the whole however the results obtained are strikingly in consonance with those which have been determined by other observers and by various methods of research.

Brodmann's book is in effect a study of the comparative organology of the cortex of mammals. Cytoarchitectonics, with which he deals, subdivides itself into (1) a reclassification of histological elements; (2) a stratification localization, and (3) a field localization, or topographical localization, the last being the only one considered by Brodmann as reliable. His first important contention is that for all mammals there exists a six-layer cortex, as follows: I. Lamina zonalis, molecular layer; II. Lamina granularis externa, external granular layer; III. Lamina pyramidalis, pyramidal layer; IV. Lamina granularis interna, inner granular layer; V. Lamina ganglionaris, ganglionic layer; and VI. Lamina multiformis, spindle-cell layer.

Brodmann holds, and is confirmed in this by Kappers's observation, that the neocortex of the lower mammals is also laid down in six layers.

Kappers in reviewing Brodmann differs with him with regard to Brodmann's manner of speaking of higher and lower animals too generally. What is more significant is the development of single layers and fields in connection with the special evolution of those sense organs, which are of particular importance in the life of the animal (Mott and Kappers).

Brodmann shows that a clearer view is obtained by grouping the six layers into two principal zones, the outer consisting of the first to third, and the inner of the fourth to sixth inclusive. The inner principal zone in lower animals is wider than the outer, which subserves higher and later acquired functions. This view, as Kappers points out, is strengthened by fiber anatomy, of which Brodmann takes but little account.

The second section of Brodmann's book concerns itself with the comparative surface organization of the cerebral cortex. He concludes from his examinations that the principles of field organization are similar in all the orders of mammals investigated.

The only thing determined with regard to the frontal region from experiments at present available on motor functions is that a closely connected agranular pre-central main region in the higher primates, causes fields with other functions to recede as has already been indicated in discussing the monograph of Kappers on the significance of fissures.

Great merging and overlapping are shown in the post-central and parietal regions. This is what would be expected when it is

remembered that here in large part is the posterior association region or concrete memory field which represents special endowments in man. The studies of the brains of distinguished men are corroborative of these cytological findings in lower mammals.

The characteristic of the occipital region is the great widening of the inner layer. In the hedgehog Mott found this layer to be very stunted.

Kappers makes a statement of much significance in his critique of Brodmann, namely, " In order to see certain brain structures clearly in the light of evolution and correctly interpret them, we must begin with the simplest materials without classifying them backwards as heterotypical or rudimentary." The forms which Brodmann calls heterotypical are the fundamental elementary forms.

In the third part of his book Brodmann gives the morphological, physiological, and pathological cortex organology.

Brodmann as a result of his researches believes that in the cerebral cortex " a distribution of specific function among cells of different morphological character, different localization, and different importance, occurs."

Great as is this work of Brodmann to which I am able to make scarcely more than passing allusion, this distinguished neuro-anatomist himself has his limitations which seem to have prevented him from properly interpreting the entire significance of his own work. Kappers and Bolton (1), both careful students of the work of Brodmann, had recognized his tendency not fully to appreciate the value of histological research regarded both from the anatomical and morphological points of view as having convincing value in deciding questions in cerebral localization. For Kappers's view I must refer to his admirable critique of Brodmann.

Bolton speaks as follows: " This author (Brodmann) not only refuses to deduce physiological conclusions from his own anatomical facts, but denies that any proof exists of a correlation between functional significance and histological structure. Such an attitude on the part of a pure anatomist is, in an anatomical sense, to be commended on the ground that simple anatomical data cannot alone afford reliable evidence with regard to functional significance. It is nevertheless to be deplored that such a careful and accurate investigator of histological structure should extend

his generalizations beyond his own anatomical province and ignore the combined anatomico-physiological investigations of other workers in the field, on the apparent ground that the wildest of hypotheses have been suggested. That even the simpler processes of cerebral association are of very great complexity cannot be regarded in any sense as proof that the well-defined and constant histological structure of the cerebral cortex is not the anatomical counterpart of such processes. A similar line of argument applied to the bulb and cord would lead to the inevitable conclusion that the neurone complexes in this region of the central nervous system are also without special functional significance."

The histological anatomy and morphology of the basal ganglia —striatum, thalamus, hypothalamus, etc.—are attracting renewed attention from those interested both in fundamental biological principles and in the practical physiological questions like the localization of special functions. I must however pass by most of this work, referring my readers to the monographic articles of Ariens Kappers (6), Kinnier Wilson (29, 30), Malone (10, 11), and others. With regard to the problem of the functions of the striatum to which I have given some attention in several publications (18, 19) I can say only that the final settlement of the moot questions regarding the physiology of this great ganglion will in large part find their solution through studies in comparative cytology. One of the papers on the program of the evening is by our colleague, Dr. Lloyd, on the morphology and functions of the striatum. I am not prepared to endorse the view that this ganglion is a vestigial organ. While it is true that in the course of evolution it has assumed new positions in the cerebral mass and has undergone remarkable changes, it still retains in the human brain large proportions and a rich cellular endowment.

Cell Type Localization in the Thalamus

Malone working in Jacobsohn's laboratory, by special methods of investigating nerve cells for the determination of probable functions has thrown considerable light upon thalamic localization. According to this investigator there is probably in the thalamus not a single cell of motor structure, whereas in the hypothalamus numerous motor cells are present. This antagonizes the views of those who give any strictly motor functions to the thalamus, including the hypothesis of von Bechterew that

there is in a certain portion of this ganglion a motor mimetic center.

Let me refer briefly to the investigation of the thalamus by Malone (10, 11) as a valuable contribution by one of our countrymen to the relations of histological anatomy and morphology to localization. Malone's monograph is a continuation of the work of L. Jacobsohn on the nuclei of the human spinal cord and brainstem which was published in the transactions of the Berlin Academy of Sciences 1908–09. It is intended to describe the cells of the human diencephalon (thalami and third ventricle). The effort is to group the cells of the diencephalon as separate nuclei so far as can be determined from their histological character. This work is not an attempt to divide the thalamus into separate regions as the result of various methods of biological research, but rather to make an anatomical and functional subdivision on the basis of histological investigations. Malone deals for the most part only with the authorities who confine their researches to the diencephalon of man, although he makes brief reference to the work of others, Da Fano and von Monakow, Haller, Ganser, Nissl, Münzer and Wiener, Bianchi and Cajal.

The method of subdivision of the thalamus adopted by Malone is that into groups of cells possessing identical histological character, completely disregarding the splitting up of gray matter by fiber masses into conventional nuclei.

Malone remarks that so far as he knows there is no work in existence which attempts to subdivide the diencephalon on the basis of purely cellular preparations. Referring to the histological observations of men like von Monakow, vonGudden, Forel, Meynert and others he says these were chiefly on the basis of carmine preparations which do not give as clear results in the way of cellular pictures as the method of Nissl. Malone warns the investigator not to regard the cell groups as separate nests or nuclei simply because these have been segregated by mechanical processes. In this category belong the cell masses which are pressed together by thick fiber bundles in their passage through the thalamus. This compression often causes considerable change in the number, position, size and form of the cells.

Malone endeavors to define clearly what he regards as cells of primary importance, considering them to be those groups in which the cells can be clearly defined from other areas by

markedly common histological characteristics. In arranging the cells he has considered as decisive their form, size, spatial relations of the cells to one another, and above all their structure. Changes in the first three characteristics are often caused by merely mechanical influences, and in such cases have only a superficial significance; if, however, these changes have a value for the nucleus they are nearly always associated with a change of structure. As characteristics of the cells he has considered the coloring and the order of the chromatophilic substance, the general sharpness of contours and of the inner structure, and the pigment contents of the cells.

Malone bases his observation on six series of the human adult diencephalon. For an account of his method of dividing and subdividing the thalamus I must refer those interested to his monograph.

First, warning again that groupings caused by mechanical means must be disregarded Malone makes some general inferences. He holds that we are justified in assuming that a more or less segregated group of cells which possess an identical cell character (above all the same structure) forms a primary nucleus which has a specific primary function, and further that two nuclei showing distinct differences in cell character also have different primary functions. That there exist inside of the primary nucleus parts which have relations to different fiber systems is no proof against the unity of the nucleus, as without such anatomical connections a working together of different parts of the nervous system is impossible. The same answer may be made to the objection that after a lesion of various parts of the primary nucleus the fibers can be followed into different parts of the cortex, or that after lesion of different regions of the cortex, the fibers can be followed into different parts of the primary nucleus; although such experimental examinations possess practical value they can only determine topographic areas which are correlated with other topographic areas, and they cannot have weight either for or against the unity of the anatomically conceived primary nucleus.

In addition to his research on the diencephalon, to which this reference has been made, Malone has done other histological work in anotomy and morphology (12, 13, 14) which has not only much absolute intrinsic value, but also is full of suggestiveness as to

the potentiality of his methods in the determination of the local-
ization of cerebral functions.   In his Johns Hopkins Monograph
(14), he justly criticizes the neglect of a study of cell structure
by most histo-pathologists.   Cell preparations, as he shows, are
too often made subsidiary to the study of tract degenerations,
and little or no attention is paid to bringing the cell character into
relation with a definite function.   I cannot better emphasize his
position on this matter of the neglect of cell types than by giving
the following citation from his monograph in which is contained
a reference to another of his publications: " The following in-
stance is a good illustration of the value of carefully noting the
cell character of various cell groups.   In his excellent study of
the dorsal (sympathetic) nucleus of the vagus nerve Molhant had
shown that all the cells of this cell column give origin to all the
vagus fibers which supply smooth muscle and heart muscle, and
that certain portions of this cell column supply smooth muscle
while a definite portion supplies heart muscle, but he did not at-
tempt to show that a definite type of cell was involved in the in-
nervation of each of these two types of muscle; after studying
the vagus sympathetic nucleus I was able to show that the por-
tions of the nucleus which supply smooth muscle and heart muscle
may be readily distinguished by the fact that they are composed of
cells of different types, and that just as heart muscle is histologically
intermediate between smooth muscle and striated muscle, just so
the cells of the vagus sympathetic nucleus which supply heart
muscle are of a histological character intermediate between that
of the cells which supply smooth muscle and striated muscle.
Such an observation of the relation of cell type to cell function
enables us to locate accurately a functional center even though
its cells be mixed with those having a different function, and
homologous centers may be recognized in different animal forms;
at the same time it emphasizes the necessity of carefully noting
the cell character of each cell group, so that even if the function
is unknown the presence of a definite cell type will offer a prob-
lem for future experimental work, and in the meanwhile preclude
the possibility of confusing this cell group with surrounding cells.
These differences in cell type are of course most definite in the
higher animals and especially in man, where the various cell
groups are highly specialized."

    In making his criticism, Malone says that he does so " not to

displace other methods, but to complement them and add to their usefulness."

With an additional citation from Malone's conclusions I must content myself by referring to his bibliography appended to this paper.

"The histological character of a nerve cell is an indication of its function. Differences in connections with portions of the organism which differ merely in spatial relations do not involve a difference in the character of the nerve cells, but are associated merely with the *location* of the nerve cell; for instance, arm and leg muscles, flexors and extensors are all innervated by the same type of cell, although such differences in peripheral connections correspond to the differences in the position of the corresponding nerve cells. It is therefore evident that experimental work which determines the connections of various portions of a given region with different portions of the organism, without taking into consideration differences of cell character, fails to distinguish between differences of connection dependent merely upon *spatial* differences and those differences of connection which involve differences in *cell activity*, such cell activity being indicated, not only in the nervous system but in all portions of the entire organism, by a definite type of cell character."

Cererellar Fissures and Cerebellar Localization

In the last decade investigations in fissural and stratificational morphology have been applied to the study of cerebellar localization as illustrated by the mammalian schema of Bolk (2) and the physiological schema of von Bechterew, based in large part on Bolk's researches. Studies in comparative anatomy show that some of the fissures in the human cerebellum which seem on first glance because of their depth, width and length to be of the greatest physiological importance are found on closer investigation not to have this value. The great horizontal fissure (fissura horizontalis magna), for instance, is of less importance as a physiological boundary than the crescentic fissure of the human anatomists. This, usually called the primary fissure (sulcus primarius), is from the standpoint of comparative anatomy of fundamental morphological and functional importance.

In a recent paper by Dr. Weisenburg and the writer (20) attention has been directed to this matter of the significance of fis-

sural development in establishing fundamental facts regarding cerebellar localization, a subject to which Rothmann (23) in his great papers on the cerebellum had previously given much attention in connection with the description of his own physiological researches.[6]

The primitive morphological subdivision of the cerebellum is into an anterior lobe comparatively simple, and a posterior lobe of much complexity, these being separated by the so-called primary fissure. As the mammalian series ascends to man the most striking and readily demonstrated change which takes place is that represented by what Bolk has called the monstrous development of this posterior complex lobe. It is in this part of the cerebellum that the vermis first takes on a really separate form and here appear new fissures and convolutions of particular shape. The development of this region is the result of extraordinary synergic acquisitions in the higher primates and especially in man. It follows, therefore, as a fundamental fact in localization that in this part of the brain must be represented those functions of synergy which are the particular possession of man—his ability to stand erect, and his ability in this position to perform the innumerable skilful synergic movements which are his particular attributes. Through such elementary facts we arrive at points of departure for studies of cerebellar localization.

As has already been indicated, the influence of neurobiotaxis in the development of the cerebellum has been studied by Cajal and van Valkenburg, and investigation of the cytoarchitecture of the cerebellum will eventually play an important rôle in the accurate determination of its functions.

HISTOLOGICAL ANATOMY AND MORPHOLOGY AND MENTAL
DISEASE

Clearer and more rational views regarding the classification, symptomatology and diagnosis of mental diseases can. I have long believed, be obtained only by our giving closer attention to questions of anatomy and morphology and especially of histological anatomy and morphology.

Bolton, in a recent book on " The Brain in Health and Dis-

[6] Charts were shown illustrating fissural plans in different orders of the primates and also Bolk's scheme of the mammalian cerebellum and a tentative scheme of physiological areas and centers in the human cerebellum

case " (1), shows a full appreciation of this fact. The mazes
of doubt and uncertainty regarding the underlying pathology of
dementia præcox, paranoia, mania, melancholia, paresis, epileptic
insanities and other forms of mental disease and disturbance, are
recognized by most workers in the field of psychiatric neurology.

Bolton holds that " there exists a definite structural basis for
the special symptomatology presented by the subjects of mental
disease, and perhaps also for the unequal mental endowments of
sane or normal persons." His investigations in demonstration
of this thesis are micrometric, that is he measures with micro-
scopic exactness the depth or thickness of different cortical
laminæ in chosen positions in the brain in different forms of
mental deficiency and disease—idiocy, imbecility, paranoia, etc.

A study of the evolution of cortical lamination in the fetus and
in the adult, Bolton remarks, is confirmatory of certain now gen-
erally accepted ideas as to differences between the projection cor-
tex and that of so-called higher association areas or zones. This
lamination has been traced by him step by step in the cases studied
with microphotographs and micrometric measurements, from the
state of undifferentiated neuroblasts in the early months of fetal
life, to the laminated appearance at birth, in childhood, in youth,
and in the adult. I cannot here make more than the briefest ref-
erence to such investigations and their results. Some points are
of fundamental value, as for instance, the fact that the inner-
most laminæ assume their form and full development earliest, the
outermost last. When such projection areas as the visuo-sensory
are considered and these are compared with the visuo-psychic,
and with the prefrontal or higher psychic region, it is evident that
the first receives its most complete development earliest, others
later, the prefrontal being the last of the neopallium[7] to take on
its full laminar appearance.

The psycho-motor area has its evolutional periods as regards
lamination, as have all the rest. The generalization which be-
comes evident in the application of cytological methods to the

[7] The neopallium is a term applied by Elliot Smith to the cerebral
cortex peculiar to the mammalia. It consists of three laminæ which un-
dergo in different members of the scale and in different regions of the
cerebrum, varying degrees of evolution or suppression. The neopal-
lium, which roughly consists of the entire cerebral cortex with the ex-
ception of the pyriform lobe and the hippocampus, differs from the
archipallium, or the remainder of the cortex, in the possession of an outer
or pyramidal cell-lamina, the middle and inner cell-laminæ being common
features of the whole of the cerebral cortex. (Bolton.)

explanation of psychic acquisitions, is that the lamina most essential to the existence of the individual is that which is first and most organized, while those which represent the higher and the highest intellectual acquisitions are the later and latest to be fully organized. Such facts as these, Bolton and others have shown, can be applied with scientific value to the explanation of mental disease, especially to those disorders of the mind which are of embryonal or teratological origin. Herein we see a fruitful field for the study of localization in connection with both physiological and clinico-pathological interpretation. One point of much importance, that in the prefrontal region laminar evolution not only occurs later than in other regions as already stated, but is individually variable might also here be emphasized that fissural evolution has close analogies as regards both time and individuality, with the evolution of lamination.

The main idea in this address has been to emphasize certain morphological and anatomical facts and principles, a knowledge of which is fundamental to a comprehension of the subject of cerebral localization. I might here with van Valkenburg ask the question—do the so-called centers, cortical and subcortical, in reality represent bodily functions? While it might be necessary to answer this question, baldly put, in the negative, it nevertheless remains true that cerebral localization is a reality. It is only necessary that one shall understand clearly what he means when he talks of centers and zones and their functions.

Experimental physiology and clinical medicine united with pathology would seem to place the existence of definite centers and zones beyond all doubt. It is indeed true that extirpation of a circumscript portion of the cerebral cortex in this or that part of the brain often results in the production of certain well defined symptoms. It is equally true that irritation by an electrical current or neoplasm may bring about definite phenomena. The one point of interest in this connection is that while centers are sufficiently defined to enable the neurologist to help his friend the surgeon to the performance of operations, even the neurologist of largest experience and acquisitions does not know the function of any single part of the human brain in its entirety until he has a thorough knowledge of all the connections of that part. In other words, he must through studies in anatomy, morphology, clinical medicine and pathology be able distinctly to recognize that a

given so-called center—one for example in the motor zone—has a complex of functions which can only be determined absolutely by a knowledge of all its connections, projection, associative, commissural, etc., with other parts of the nervous system. Even in the case of a motor center the mere understanding of the phenomena of movement which it represents is not sufficient. The diaschisic phenomena of von Monakow can be clearly revealed only by an elaborate consideration of all the cellular connections of any given region.

It has always seemed to me that J. Hughlings Jackson (5) more clearly than anyone else had a true vision of the inner meaning of the idea of localization in the cerebrum and indeed in all parts of the nervous system. In the highest sense of the word he was a localizationist and believer in the doctrine of "centers," but for him centers had a significance not fully grasped by others. In his fundamental conception lay the germs of the hypothesis and theories which since under various names have been brought to the attention of neurologists, as for instance, the doctrine of neural mechanisms and of diaschisis of von Monakow. Jackson's lower, middle, and higher levels in the nervous system are levels of representation, re-representation, and re-re-representation. The idea is simply that of the most differentiated representation correlated with higher and highest representation of the same parts in more and more complex combinations or syntheses. "I have already said that units of the highest centers," says Jackson, "are at once universally (factor integration), and specially representing; that every unit represents all parts of the body, and yet that each represents some one part of it first and most. This is repeating that the peculiarity of every part of the body is respected, however high evolution is carried. The fact that a man can shrug his shoulder of necessity implies that the movements effecting this operation have, in some parts of the highest centers, a more special representation than all other movements have in that part. In so far as any part of the body (lowest level of evolution of the whole organism) has a degree of independence of the rest, in so far it has a corresponding degree of specialty of representation in the highest centers. I hope these remarks will be borne in mind by those who object to the use of the term 'centers'; they will see that I do not use it rigidly. Thus the 'arm center' in the Rolandic region (middle motor centers) is

for me a center representing movements of all parts of the body, but yet movements of the arm very much more than any other movements."

Available Anatomical and Morphological Material

In conclusion it may be asserted that the society's record of work has been one of which it may justly be proud. Nevertheless it has not done what it might have accomplished in the fields to which I have directed attention this evening. This is not because we are unprovided with the material for such work. It is at our hand.

In the first place, the Zoological Garden of Philadelphia affords constant opportunity for obtaining the brains of animals of different species. I have here tonight a series of brains obtained through the courtesy of Dr. Williams B. Cadwalader, one of our university neurological staff who is also prosector at the zoological garden. These specimens illustrate a series of mammalian brains from the lemur negrofrons to the chimpanzee. This series with other specimens from lower animals which could readily be added to it affords material for comprehensive and thorough morphological investigations, both macroscopic and microscopic, similar to the researches of Parker and of our confreres abroad. Human specimens, especially fetal brains and low type and average adult brains such as can be obtained from the Philadelphia General Hospital, are always at our disposal. We still have in the laboratory of neuropathology at the University of Pennsylvania some specimens of the brains of criminals and paranoiacs which were used many years ago in preparing one of my papers. If anyone should object to these specimens that they are antique for purposes of real research, I might refer him to the morphological work of Elliot Smith (24) on the brains of Egyptian mummies. The story of his work is by the way an interesting one and may serve to lighten the more serious strains of this paper.

Elliot Smith was for many years professor of anatomy at the Egyptian Government School of Medicine, at Cairo. While in Egypt he made a particular investigation of the brains of a number of mummies of early historic and pre-historic times. In one of his papers he has given photographic reproductions of the fissures and convolutions of some of these specimens. It was urged

against the reliability of his investigations that Virchow and others had indicated their belief that in the mummies of Egypt the brains were not preserved, but that the substance found in the skull was a resinous material used in the preservation of the mummies. In answer to this assault upon the accuracy and reliability of his observations, some archeological inquiries of much interest were made.

Elliot Smith estimated that in the forty-seven hundred years during which the Egyptians practised embalming, about four hundred millions of people were embalmed. He says also that almost every archeologist who has studied the bodies found in the innumerable cemeteries of Egypt knows that the brains are frequently present in the skulls of those bodies not mummified by artificial conservative processes. His investigation shows that the materials found in many of the crania submitted for inspection were undoubtely brains. In addition this is proved by the fact that such masses have been obtained in crania which have not been severed from the body and which in fact have not been opened. These intracranial masses are brains which have been dried and preserved by natural processes. In one prehistoric cemetery containing nearly five hundred bodies the brain in every instance had been preserved. The same has been noted in other cemeteries of later periods, especially when the bodies have been preserved in dry soil and have been placed where the air had no direct access to them. He found that the brain masses varied much in size. They were usually about two thirds or less than half of the original dimensions. In the case of many of these masses it was possible accurately to determine the course of every sulcus on the lateral and mesal aspects of the cerebral hemisphere. He gives actual photographs and two diagrammatic schemes of the fissures and convolutions in a speciment from a cemetery of the XVII dynastic period (about 2000 B. C.). It would appear that the process of embalming with the removal of the brain was confined to those who had sufficient influence or left sufficient money to have this semi-religious rite performed. In these cases or some of them it was said that the ethmoid bone was fractured and the brain was sucked out by some method of aspiration. It would seem, therefore, that the kaisers and mikados of those periods, known as pharaohs, and the Rockefellers, Carnegies and Dukes of West-

minster of Egyptian times probably had their brains removed in the process of artificial conservative mummification; while the mass of the people, fortunately for the cerebral archeologist, were buried brains and all, and if these burials were in soil sufficiently dry and well drained the specimens remained fit material for study after thousands of years.

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NERVOUS AND MENTAL DISEASES AND THE NEWER PATHOLOGY

By F. X. Dercum, M.D., Ph.D.

PROFESSOR OF NERVOUS AND MENTAL DISEASES, JEFFERSON MEDICAL COLLEGE;
CONSULTING NEUROLOGIST TO THE PHILADELPHIA GENERAL HOSPITAL;
FOREIGN CORRESPONDING MEMBER OF THE NEUROLOGICAL SOCIETY
OF PARIS; FOREIGN CORRESPONDING MEMBER OF THE NEU-
ROLOGICAL AND PSYCHIATRIC SOCIETY OF VIENNA;
MEMBER OF THE ROYAL MEDICAL SOCIETY
OF BUDAPEST

The time, it seems to me, has arrived when it is possible to assemble and to weigh as to their significance numerous important facts bearing upon the pathology of the nervous system. In order that we may view these facts intelligently, it is necessary first to dispose briefly of the following preliminary considerations. To begin, nervous diseases are quite commonly divided into organic and functional. This distinction possesses a certain amount of practical value, but when analyzed it proves in its essence to be neither valid nor scientific. An affection which is attended in its early stages by no organic changes whatever may in a later stage be attended by changes gross in character. A notable instance of this is paresis, the symptoms of which may be pronounced in the early stage and yet this early stage reveal not the slightest structural change in the nervous system. Again, a broad distinction is habitually made between nervous diseases on the one hand and mental diseases on the other. While this distinction has in its turn an undisputed practical value, it likewise proves upon analysis to be invalid. This is shown by merely a cursory examination of the facts. Thus, it is well known that epilepsy may in addition to, or in place of, the gross nervous phenomena which it ordinarily presents, also present mental phenomena, and, indeed, often to such a degree as to necessitate its being classified among the insanities. A similar truth obtains in regard to hysteria, and when we turn our attention to its congener psychasthenia, we at once recognize that we are dealing with an affection which is still, in large part, in the domain of

nervous diseases and yet frankly occupies a place among mental diseases. Similar truths obtain in regard to melancholia and mania, and dementia præcox and paranoia, and, indeed, to mental diseases in general. The latter are, properly speaking, in this sense, merely functional nervous affections and must be embraced in any inquiry dealing with the pathology of the latter.

The facts which I am about to present in such an inquiry are facts which deal with material things. This truth cannot be sufficiently emphasized. The facts deal with changes of structure and function, with problems of metabolism, intoxication, infection, with questions of biochemistry and with other matters, all of which are identical in their nature with those which confront us in internal medicine. It is a remarkable fact that for years past many alienists have turned their attention to psychology rather than to internal medicine, the facts of which though of ever increasing importance have received but scant attention at their hands. The day however has gone by when we can be content with explanations of psychology and least of all with those of that now fast vanishing cult psychoanalysis.

All of the phenomena presented by the human organism, digestion, nutrition, the maintenance of the bodily temperature, the elimination of nervous and muscular energy, are convertible into terms of tissue chemistry. It is the summation of these manifold and complicated chemical processes that constitutes that moving aggregate which we recognize as the living individual. It is the derangement of these processes which constitutes disease.— a derangement which may have its origin spontaneously in some fault of the organism or which may be secondary to some cause introduced from without, such as a poison or infection. The metabolism of the body in health is as yet, it must be admitted, very imperfectly understood; notwithstanding there can be no doubt that its disturbances entail states of intoxication, and in these states of intoxication must be sought the pathology of mental and nervous disorders. Theories of autointoxication are as old as Hippocrates. In modern times they were advocated by Pinel, Esquirol, Morel, and others, though these older psychiatrists were inclined to regard states of intoxication as secondary to a primary affection of the nervous system. Numerous subsequent observers, among whom should especially be mentioned

Mendel, studied the urine, blood and other fluids, but while many
of the facts ascertained were interesting, nothing of value was
achieved; and, indeed, the subject did not assume even a scien-
tific character until Bouchard introduced his theory and methods.
Bouchard taught that the ogranism was a laboratory of poisons
and this equally in the normal as in the pathological condition.
In the normal condition these poisons are in one way or another
made harmless, but in pathological states, when the protective
measures of the organism are weakened, these poisons circulate
in the blood and are excreted by the urine. Bouchard it will be
remembered worked out a method of determining the degree of
the toxicity of the urine, a method which found a later application
also in the study of the toxicity of the serum. A definite amount
of normal urine was found to be lethal to a certain weight of
rabbit and thus was determined the coefficient of the toxicity of
the urine. As the urine of the insane frequently showed an
increase in this coefficient it was naturally ascribed to an in-
creased output of poisons. However, the existing knowledge of
physiological and chemical processes was not sufficiently advanced
to render the results of value. No information was yielded as to
the sources of the poisons and but little as to their character.
Besides the method took no account of such an important factor
as the difference between the osmotic pressure of the urine and
that of the serum of the blood; and the findings were also con-
fusing in that the coefficient sometimes rose with a maximal in-
tensity of symptoms and sometimes rose with a minimal intensity,
or instead of rising, falling under the same circumstances. These
facts, while they admitted of explanation, did not do so in a
satisfactory manner. Similar experiments were made and similar
results achieved with blood serum, and in this connection Rebicci's
observations that the blood of epilepsy, paresis, senile dementia
and amentia is poisonous to the leech, are of historic interest,
as are also other observations made as to the toxicity of the
perspiration and of the cerebro-spinal fluid.

I well remember the profound interest which these theories
of toxicity aroused, as likewise the disappointment which neces-
sarily followed. We all of us remember, also, the extensive rôle
that was at one time assigned to the uric acid group and its
congeners, a rôle that to-day still demands consideration. The

leucomaines, as they were named by Gautier, are regarded, as is of course well known, as the products of the incomplete oxidation and hydration of proteid substances. In some respects they resemble the vegetable alkaloids, and it was at first believed that their presence in the urine was sufficient to account for the symptoms of a given case. All that it seemed necessary to do was to further the elimination of these poisons, or to prevent their formation, or in some way to render them harmless. These expectations were of course doomed to disappointment, but, though the doctrine of the leucomaines like the earlier views of toxicity failed of a definite result, the one great truth still remained, a truth which Bouchard and his followers had early perceived, namely the great fact of auto-intoxication.

The doctrine of auto-intoxication gained force from the subsequent and rapidly accumulated knowledge as to the rôle played by poisons of exogenous origin in the production of mental disease, notably alcohol and the infections. The disorders which these poisons cause,—delirium, confusion, stupor, dementia,—are now clearly recognized. Regis and later Kraepelin pointed out the rôle of the infections. Kraepelin was one of the first to insist that the mental symptoms are the result of the action of bacterial toxins. These toxins, it would appear, may act directly upon the cortex, or the infection may bring about disturbances in the functions of other organs, disturbances leading to changes in the general metabolism of the body, to the formation of endogenous toxins and to the consequent auto-intoxication of the entire organism. Infections variously involve the liver, the kidney, the thyroid, the adrenals and other glands and tissues. The fact of such involvement is based upon indisputable clinical and pathological evidence. That under such circumstances an intoxication may be very complicated and very persistent goes without saying. A proper appreciation of this fact lends renewed interest to the mental phenomena of infection. The prolonged confusions that now and then occur during the post-febrile periods of typhoid fever and other acute infections, the prolonged confusional insanity every now and then met with in alcoholic subjects, are clearly due not to the original infection, not to the poison originally ingested, but to the secondary toxemia of a deranged metabolism. Again, the part played by the in-

fections enables us to understand more clearly the mental phe-
nomena every now and then observed in the early stages of
the subacute infections, syphilis and tuberculosis. Here mental
symptoms are often observed long before the physical signs
peculiar to the infection become manifest, *i. e.*, long before
organic changes occur. Such symptoms must necessarily be
toxic in origin. That they occur early in paresis and early in
tuberculosis every alienist knows.

With these considerations before us, let us turn our attention
to auto-intoxication proper, that is, to primary or endogenous
poisoning. A moment's reflection reveals that primary auto-
intoxication is of two kinds; first, one that is gastro-intestinal in
origin and another that arises in the tissues of the body itself.
This distinction, however, may in practice be a very difficult one.
An intoxication by way of the intestinal tract may give rise to
secondary disturbances of metabolism within the body, *e. g.*,
derangements of the liver or of the thyroid gland, or, intoxica-
tions having their origin within the body proper may be followed
by a secondary intestinal intoxication; of this melancholia and
other affections in which the innervation of the intestinal tract is
diminished, afford abundant examples. In considering gastro-
intestinal intoxication as a possible primary factor, we must bear
in mind that in the normal or healthy individual, intestinal poisons
are destroyed by the liver, the thyroid and by the other glands
and tissues generally, or, eliminated by the various excretory
organs. Poisoning of the nervous system is thus effectively
guarded against. However, in diseased and defective states, it is
possible that invasion occurs and that it may also produce, as
above pointed out, secondary disturbances of metabolism. The
presence of phenol, indol and skatol in large amount bespeak, of
course, intestinal intoxication, but, on the whole, it may be safely
said that when there are present marked or persistent nervous
symptoms, we have to deal with a coëxistent and probably pri-
mary, interstitial or endogenous poisoning.

The detailed chemistry of the urine, a chemistry which deals
largely with the end results of the disorders of metabolism, can-
not long detain us here. The amount of nitrogen, sulphur and
phosphorus excreted, the mineral waste and the output of water
are all facts of great interest but are obviously secondary in im-

portance to other and more recondite changes. Suffice it to say that some of the facts suggest disturbances of the glands of internal secretion; others indicate relationships between different disorders, e. g. between migraine and epilepsy, between epilepsy and diabetes and between epilepsy and some forms of manic-depressive insanity.

However, the clinical histories and the course of many mental diseases suggest a more profitable line of inquiry. The facts suggest that we have to do with biochemical processes akin to those of infection and immunity. The history for instance of an attack of melancholia, its gradual invasion, maximum onset of symptoms, gradual subsidence and final recovery, is strangely like that of an infection. That we have to deal with fermentative or enzymotic processes is exceedingly probable. Let us see what the facts indicate.

Intoxications of short duration probably play here a relatively unimportant rôle; in brief intoxications we have to deal with poisonings which the organism successfully resists and, so to speak, disposes of speedily and promptly. For such resistance the organism is admirably equipped. We have in the very beginning the defensive action of the gastric and intestinal juices. If injurious substances notwithstanding gain access to the organism they are submitted to the action of that wonderful laboratory the liver and later to that of other glands and tissues. Substances are oxydized, deoxydized, hydrated, dehydrated or variously combined or disintegrated and finally eliminated. Such is probably the course of intoxications of short duration, but in those of long duration such as are commonly observed in mental disease, the organism doubtless has recourse to the formation of immune bodies; in other words, the organism reacts to intoxications just as it does to infection, namely by a defensive fermentation. The rôle that the fluids of the organism play in its protection we have been taught by Buechner, Bordet, Bouchard, Behring, Roux, Kitasato, Ehrlich and others. The agencies at work have been shown to be substances which bring about immunity by a biochemical action, an action that is probably reducible to physico-chemical terms. In combating the poisons which give rise to nervous and mental disorders, the phagocytes have, it would seem, no opportunity for the exercise of their

special function, but it is not improbable that they join the serum of the blood in furnishing protective substances. The truths revealed in the discovery by Behring and Roux in regard to the curative and preventive action of the serum of animals immunized to diphtheria, in the discovery by Kitasato and Behring of the kindred facts in regard to tetanus and by Simon Flexner in regard to cerebro-spinal meningitis, constitute stories of brilliant human achievement. Ehrlich's results in regard to ricin and abrin and Calmette's in regard to cobra poison are likewise familiar to us all. Nor need we call attention to the specific sera developed against definite microorganisms, the bacteriolytic sera, nor to the sera developed as defensive agents to erythrocytes, the hemolytic sera, nor to the numerous other cytolytic and cytotoxic sera that have been experimentally produced, such as the hepatotoxic, thyreotoxic, neurotoxic, spermatotoxic sera and others that might be mentioned. The doctrine of antigens and anti-bodies is destined it would appear to have an ever widening application. An antigen is, as we all know, a substance which when introduced into the organism is supposed to bring about the formation of a specific antibody. Among such substances are microorganisms, their toxins, cells of various kinds or extracts of their substance, poisonous and non-poisonous proteids and lipoid substances.

It would obviously be out of place to dwell here upon the details of the theory of the antigens and antibodies save to recall some of the basic facts, the application of which to our special inquiry will become apparent later. Thus, the body resulting from the union of the antigen and antibody is composed of two basic substances, one the thermostable, the other the thermolabile substance. The thermolabile substance can only combine with an antigen whether the latter be a microorganism, an erythrocyte, a toxin, a proteid or what not, after the latter has been prepared, i. e., treated with a specific thermostable substance. The thermostable substance is the amboceptor of Ehrlich, the fixator of Metschnikoff, the corps sensibilatrice of Buechner and Bordet; the thermolabile substance is the complement of Ehrlich, the cytase of Metschnikoff, the alexin of Buechner and Bordet. It is significant that the thermolabile substance is found in the normal serum.

Let us now turn our attention briefly to the elementary facts

of precipitation, agglutination, opsonin reaction, and complement binding.

If a parenteral injection of an antigen be made into an animal, the serum acquires a new property, *i. e.*, when it is added to an emulsion of the material originally employed there ensues a flocculent precipitate. The antibody which is the cause of the precipitation, is in this instance termed the precipitin. Like other antibodies it has a specific character; that is, it causes a precipitate only with preparations containing the corresponding antigen.

The phenomena of agglutination are briefly summarized as follows: if the serum of an animal immunized to a bacterial culture or its products, be added to a liquid in which these bacteria are suspended, the latter begin to aggregate in masses and to sink to the bottom of the tube; of this the Widal reaction is a familiar instance. The antibodies are here termed agglutins and are of course specific in their action. Very little work has thus far been done upon the phenomena of agglutination in the sera of the insane.

Opsonins are, as is of course well known, substances which prepare microorganisms for consumption by the phagocytes. Opsonins exist preformed in the serum and are probably alexins or complements, *i. e.*, thermolabile substances. In how far they play a rôle in the defense in cases of mental disease of bacterial origin is of course an open question. The opsonic index is on the whole reduced in the chronic insane, though it is increased in some cases of dementia præcox and increased in the larger number of epileptics. It is interesting to know that D'Abundo found the bactericidal properties of the blood increased in paresis, in pellagrous insanity, in mania and melancholia, while in paranoia it was normal or not characteristic.

Complement binding—a reaction which was discovered by Bordet and Gengou—consists in the fact that when an antigen and its corresponding antibody meet, the complement is held fast. This fact can be demonstrated by the addition of a hemolytic system; if the complement has been held fast there is no hemolysis. This is of course the basis of the Wassermann reaction. However, the principle has been applied to the study of other affections than those supposed to be syphilitic. Thus Geiszler immunized rabbits with the serum of various cases of insanity by giving five or six injections into the abdominal region at in-

tervals of five or six days. After the third injection Geiszler observed that the serum of the rabbits immunized with the serum of dementia præcox had acquired the property of complement binding with the serum of all dementia præcox cases, hebephrenics or catatonics, while the same serum yielded no reaction with the serum of healthy persons or that of patients suffering from other forms of mental disease. Similar results were obtained with the precipitin.

When we turn our attention to anaphylaxis, we find that it appears to be increased for tuberculosis in dementia præcox. This points to a connection in this affection between the functional disturbances of the glands of internal secretion and tuberculous infection, a fact to which I called attention several years ago.

The hemolytic action of the sera of the insane is alike interesting and important but cannot detain us here, suffice it to say that they show suggestive and significant departures from the normal in epilepsy, manic-depressive insanity, dementia præcox and alcoholism.

The lymphocytosis of the cerebrospinal fluid, so important as a diagnostic factor, depends upon changes foreign to those thus far considered and need not detain us farther than to point out that it is met with in paresis, tabes, cerebrospinal syphilis, the scleroses, brain tumors, and in various forms of meningitis.

The rôle of antigens and antibodies, of precipitins and agglutins, the phenomena of complement binding, the play of the opsonins, hemolysins and other substances, suggest that all these processes are the expression of a common biochemical or physicochemical action, namely, of a fermentation. All of the processes of nutrition, all of the changes exhibited by proteids and carbohydrates, are the expression of such an action and occur under the influence of catalytic and enzymotic processes. Again the fact that ferments consist of two basic substances, first a zymogen and secondly an activator, goes far to prove the identity of fermentation and immunizing processes. Further, just as antigens lead to the formation of antibodies, so do ferments lead to the production of antiferments, e. g., pepsin to antipepsin, trypsin to antitrypsin. Again, ferments also manifest the property of specificity; thus each ferment is active upon a specific substrate. Finally, in regard to fermentation in general, the conclusion is justified that it is a universal property of living matter. A point

of practical importance may be added, namely that many ferments preserve their activity for some time after the death of the organism; thus in a measure this subject is open to postmortem study. The studies thus far made are intensely interesting; *c. g.,* it has been found that antitrypsin is increased in all cases in which the amount of proteolytic ferments is increased and in which a reduction of proteids with a corresponding degeneration of cell elements is taking place. Thus the antitryptic properties of the serum are increased in paresis during periods of increase of symptoms and diminished during remissions. It is interesting also to add that it is diminished after salvarsan administration. Similar phenomena of increase and decrease are noted in alcoholic insanities and on the whole the inference seems warranted that an increase in the antitryptic property of the serum is an unfavorable indication.

Let us now turn our attention briefly to the aspect of the subject of fermentation developed by Abderhalden. The method of study employed depends upon the fact that a foreign proteid substance intorduced into the blood excites the production of a ferment, the action of which is to protect the organism against the foreign substance. Such a foreign substance may gain access to the blood from without or from organs and tissues within the body. An instance is the digestion of placental elements by ferments in the blood of the pregnant woman, the blood of the nonpregnant women and of men containing no such ferments. The work which Abderhalden and his pupils have done is already very large in amount and the subject has become so extensive as to be impossible of inclusion in so brief a statement as this address necessitates. Suffice it to say that Fauser and others have tested the digestive or reducing action of the sera of different forms of insanity in relation to the thyroid gland, the sex glands, the brain, the kidneys and other organs. Many remarkable observations have been made.

The time at my disposal will only permit of a few additional observations; these will be somewhat in the nature of general statements. First, proteids and lipoids alone can evoke the formation of antibodies, and in this process lipoids appear to play the rôle of activators, and their injection seems to bring about an increased formation of immune bodies. Second, the specificity of immunity and fermentation processes does not appear to be

entirely absolute. It is very probable that such biological con-
ceptions as antigens and antibodies will be replaced, indeed, are
being replaced, by more precise chemical conceptions. It appears
that the curative action of a given serum depends upon its con-
taining a larger amount of substances already normally present
in the body. Syphilitic antigens, for instance, may be derived
from various normal tissues but under the influence of the spiro-
chete they increase in amount. Third, it is exceedingly probable
that the physical structures of colloids is able to explain the proc-
esses of fermentation. Colloidal substances seem especially
able to evoke the formation of antibodies. Fourth, in the struggle
with intoxication and auto-intoxication, a most important rôle must
be assigned to the glands of internal secretion. The various other
tissues and organs of the body, in addition to their special func-
tions, possess also the function of internal secretion inasmuch as
they elaborate, as a result of their functional activity, and pass
into the blood and other liquids of the body, certain substances
which in one way or another act upon other organs and thus add
to the number of the hormones as we now term them. The life
of the organism is that of a well coördinated chemical whole. It
is the disturbance of this coördinated chemical whole either by
the introduction of foreign substances from without or by the
breeding of foreign substances within the body through the break-
ing down of the coördination, that causes intoxication. Disturb-
ances of metabolism, using this term in its widest sense, are
therefore the basic factors in mental diseases, and this truth
brings mental diseases properly within the province of internal
medicine; but in order that they should be viewed in their proper
perspective, the following important facts must be borne in mind.
Mental diseases, as just indicated, separate themselves into two
great groups; first one in which the disease is due to infection or
exogenous poisoning and second one in which the disease is due
to endogenous poisoning.

    In regard to the first group, our therapeutics, our ability to
interfere to the advantage of the patient, is in a far better posi-
tion. In the second group, we have disorders which occur in or-
ganisms whose structure is chemically and physically essentially
defective, deviate and aberrant. Their peculiarities are unfor-
tunately hereditary and innate. These peculiarities do not mani-
fest themselves markedly as a rule until the period of life is

reached at which metabolism assumes a special activity, that is, at puberty or later. At puberty, in adolescence, in early adult life, the sexual glands and with them all of the other glands of internal secretion and hormone producing structures and tissues, take on a new rôle, enter upon a new chemistry, and if the organism be badly constructed, be badly put together, this chemistry becomes aberrant and toxic, and mental disease results. How powerless we must necessarily be in the face of such facts need not be dwelt upon. However, two hopes are held out to us; first, in the manic-depressive group in which the entire picture is one of the predominance of antigens in the early stage—in an attack of melancholia or mania as the case may be—and of the predominance of antibodies in the later stage, it is by no means impossible that sera will be devised which will enable us to cut short such attacks and perhaps to practice preventive immunization for recurrences. It is with regard to the heboid-paranoid group, the great group of dementia præcox and paranoia, that the outlook is the most discouraging. Here we must necessarily be limited to simple physiological therapeutics, but even here if these procedures be properly applied much can in given instances be accomplished. It is, however, in the field of eugenics that the second hope arises, forlorn and distant as this may be. We physicians, however, know that defects of stock arise largely from the infections and poisonings from which the ancestors have suffered. Syphilis, tuberculosis, alcohol, are the potent causes of structural and chemical deviation and degeneration, much more potent than insufficient food or exposure. It is in the minimizing of these factors that the hope of the future lies.

THE MORPHOLOGY AND FUNCTIONS OF THE CORPUS STRIATUM

By James Hendrie Lloyd, M.D.

It is my purpose this evening to discuss the corpus striatum, first with reference to its morphology, second with reference to its functions and diseases. The paper, I fear, will not be an orthodox one; nevertheless, I have no apologies to make for it beforehand. As in the case of every man who assumes a rebellious attitude towards recognized authority, I may meet with strong disapproval, but as one of the few remaining original members of this society, I will try on this its thirtieth anniversary to exemplify the spirit in which we have worked together for thirty years, and which has given all of us the right to play the part of free lances whenever we have felt inspired to do so.

The corpus striatum has loomed very large recently in pathology. To be exact I ought perhaps to say the lenticular nucleus; but as the lenticular nucleus is only one of the broken fragments of the original striate body, it serves my purpose better to adhere closely to morphology, and to include the part in the whole. The striate body is the organ under review.

The comparative morphology of the corpus striatum is one of the most interesting studies in neurology. It is a study that carries us far back, even to a period before the origin of the vertebrates. There is no part of the brain that has such an instructive story to tell, if only it is looked at knowingly. Before the amphioxus was born, or even the larval ammocoetes of the earliest vertebrate was brought forth, the corpus striatum had begun to do duty as a brain mass in the arthropods. It was in fact the whole brain in the arthropods, being known to-day as the supra-esophageal ganglion, and it continued to do duty as practically the whole fore-brain in the earliest vertebrates up to and including the fishes.

This subject has long interested me for its bearing on the physiology and pathology of the brain; and the interest has now

become acute because of the enormous claims put forth by some neurologists for the part alleged to be played in disease by the lenticula.

I am disposed first to enter a gentle protest against what seems to me to be a cloisteral method of manufacturing syndromes; and to call the attention of this society to a mode of view which in my opinion has too much been neglected. If we were sometimes to take a larger survey of the nervous system, in its evolution from lower forms, we might acquire a wholesome distaste for the artificial point of view which is apt to be too much in favor with us neurologists. At any rate, it is refreshing and invigorating at times to go far afield. I invite your attention, therefore, to a brief excursus into the remote past.

I shall base my discussion of the morphology of the corpus striatum largely on the work of Gaskell,[1] for I am not an original worker in this field. In his treatise on the origin of the vertebrates Gaskell undertakes to establish the thesis that the vertebrates were developed from the arthropods, and that the cerebrospinal axis of the vertebrates was originally developed around and including the gastrointestinal tract of this lower form. If you will stop to reflect a moment, you will recall that in the arthropods, which include the crabs and the spiders, as well as in still lower forms, such as the insects and the segmental worms, the nervous system lies ventrad of the gastrointestinal tract. It consists of a chain of ganglia lying beneath the creature's ventral surface; whereas in the vertebrates just the opposite is true, for in them the cerebrospinal system is located dorsad of the stomach and intestine. For a long time this was a stumbling block to evolutionists, for the problem stared them constantly in the face how the vertebrates ever succeeded in getting their nervous system on top of their bellies. The evolutionists resorted to all sorts of expedients to explain this apparently inexplicable thing; and such an eminent morphologist as Owen even proclaimed his belief that before the arthropod could have developed into a vertebrate, the creature must have turned over on its back. Of all the somersaults on record this was entitled to the prize!

But Gaskell sees no need of resorting to such evolutionary tactics. For him the arthropod did not need to turn over on its

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[1] The Origin of Vertebrates, London, 1908.

Fig. 1. In the arthropod is seen the large cephalic stomach, entered by the esophagus, which opens on the ventral surface. In front of this opening is a large ganglionic mass, the supra-esophageal ganglion. Behind the opening is another large mass, the infra-esophageal ganglion. These two ganglia are connected by nerve tracts which embrace the esophagus, and which represent in a rudimentary form the future cerebral peduncles. Beneath the gut is the chain of nerve-ganglia. The elements of the future vertebrate cerebrospinal axis, here represented, are as follows: the supra-esophageal ganglion is to become the primitive fore-brain mass, or corpus striatum; the infra-esophageal ganglion is to become the ponto-bulbar region, or hind-brain; the esophagus is to remain as the infundibulum; the chain of ganglia is the future spinal cord; the membranous wall of the cephalic stomach is the basic membrane on which is to be built up the cerebral hemispheres, especially the anterior portion of this wall, which is to be called the pallium.

Fig. 2. This represents the ammocœtes, a larval form of one of the earliest vertebrates. The advance made can be seen at a glance. The gastrointestinal tube has now become a cerebrospinal canal. It no longer opens by an esophagus, but the place of its former opening is indicated by infundibular structures. Well in front lies a large ganglionic mass on the floor of what we may now call the primary fore-brain vesicle. This mass, formerly the supra-esophageal ganglion of the arthropod, has now become the corpus striatum. In this early form it represents pretty much all that there is of a fore-brain, for this animal, as can be seen, had no cerebral hemispheres. Behind and on the floor of the canal are the hind-brain structures, the former infra-esophageal ganglion; and above is the pineal eye. Between this pineal eye and the corpus striatum is only a thin membranous wall, without nerve tissue. This is the pallium, upon which is to be built the future cerebral hemispheres.

Fig. 3. In the fish the corpus striatum is still the real fore-brain, for the pallium is still undeveloped, and is nothing as yet but a membranous wall. Connected with the corpus striatum, but not shown in the figure, is an immense rhinencephalon, or pair of olfactory lobes, extending far out in front. In fact, the olfactory and optic nerves are from the very beginning in the arthropods connected with, or have their origin in, the fore-brain structures; and this continues to be so in the highest vertebrates. The fishes have also developed large optic lobes and behind them a cerebellum. The infundibulum, with the contiguous pituitary, is plainly seen.

Fig. 4. The amphibia show a beginning cerebral hemisphere; and this, it is to be noted, has developed on the pallium, or anterior membranous wall. It contains a few ganglion cells. We now begin to see something that looks like a ventricle, which extends down into the infundibulum. What is left of the pallium has become folded inwards as a velum interpositum and choroid plexus. The corpus striatum is still the better part of the fore brain.

1 ARTHROPOD

Cephalic Stomach.

Oesophagus.

Anus.

2 AMMOCOETES

P

CorP.

3 TELEOSTEO

P

CorP

4

CorP
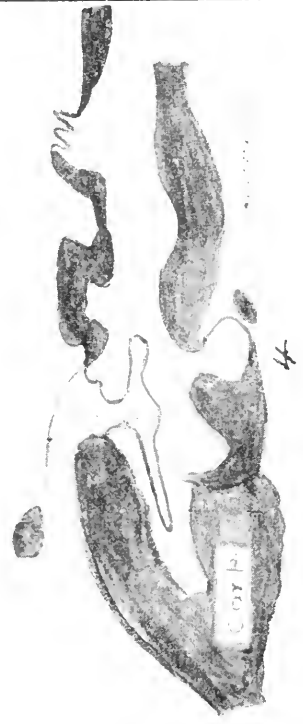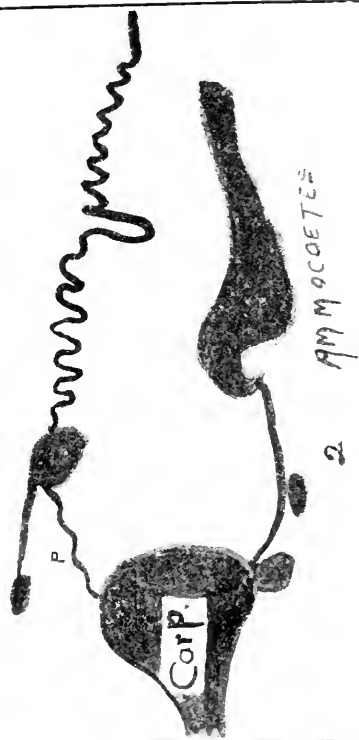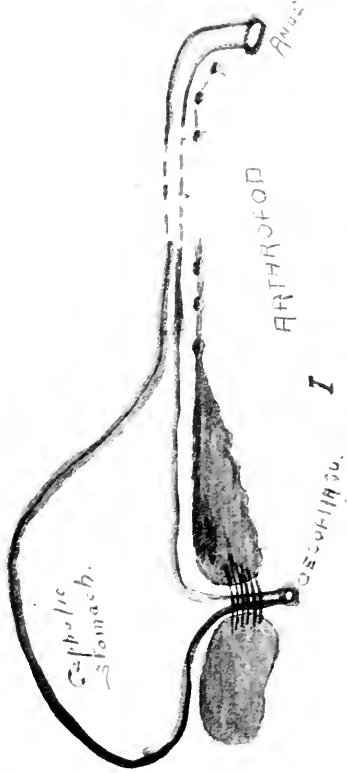
Fig. 5.   In the reptilia the chief thing to be noted is the great increase in the size of the cerebrum, growing on what was the pallium. We first now, in fact, begin to have a true brain in our modern conception of a brain, for, according to Edinger, we first meet in reptiles with a deposit here of pyramidal cells, disposed in several layers and covering most of the surface—a true brain-cortex.   The corpus striatum is beginning to be buried beneath this rapidly evolving pallium.   Moreover, as it was necessary for this growing brain-cortex to extend its connections to the ponto-bulbar structures and the spinal cord below, a way was established by taking the shortest cut, and this shortest cut was right through the corpus striatum.   In fact, the corpus striatum was literally broken into two fragments; and it remains so to this day. We call these fragments the lenticular nucleus and the caudate nucleus. That short cut is the internal capsule.

Fig. 6.   The bird's brain is remarkable for the great development of the cerebellum; and for a corpus striatum that attains a relative size and complexity found in no other class of animals, while the formation of the cortex does not much increase.   It would seem that the bird must still have a very active corpus striatum, as this structure forms the larger part of its fore-brain.

Fig. 7.   When we come to the mammalian brain, which is the highest type, we find a fully developed cerebrum.   This cerebrum, growing on the pallium, extends farther and farther backwards, gradually in successive forms covering more and more of the mid- and hind-brain structures, until in man its enormous mass overlies even the cerebellum.   Here is the true brain, which has gradually dispossessed the little primary corpus striatum and buried it out of sight.   It is an instance of the evolutionary triumph of the greater over the less.

Fig. 8.   The fact that the corpus striatum has no direct connection with the brain-cortex, is shown in this figure after Edinger.   It is seen that the pallium, or brain-cortex, incloses the striatum much as the skin of an orange incloses the pulp; but there is no direct connection.   This can be demonstrated by careful dissection at the line of contact between the two at the external capsule.   They can be separated without tearing. Moreover, it is evident from this demonstration that nature in her evolutionary process has not spared the corpus striatum, for she has literally broken it into two fragments in her need to force a way through it for the motor and sensory tracts in the internal capsule.

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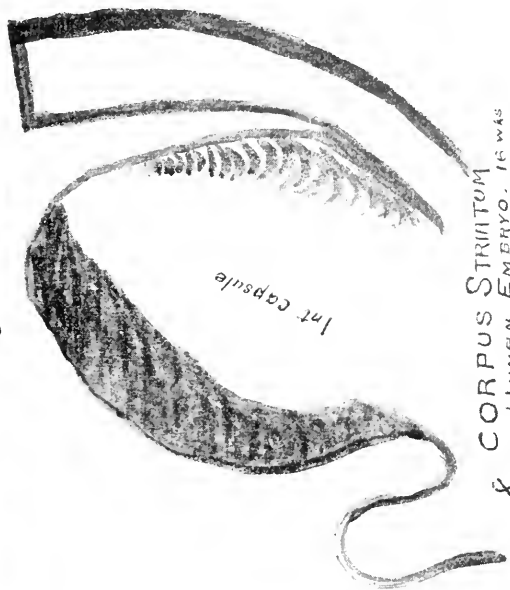
8 CORPUS STRIATUM
HUMAN EMBRYO. 16 WKS

Int. capsule

Cort. Striat.

6

Corb. Striat.

Reptilia

5

Corp. Striat

Mammh

Cort.
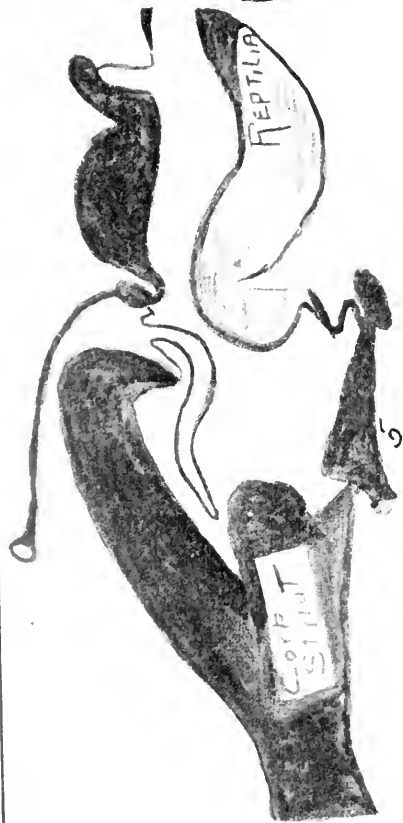
back in order to become a vertebrate. The process was much
simpler. In brief, Gaskell holds that the nervous system of the
vertebrate was evolved by a process of building up nervous tissue
around the old gastrointestinal tube of the arthropod. To use his
expression, the gastrointestinal tube was gradually invaded by
nerve-tissue. The infundibulum thus represents the old eso-
phagus; the pineal gland is the old median eye; the corpus
striatum is the supra-esophageal ganglion; the ventricles of the
brain are what remains of the arthropod's stomach; the spinal
canal is what remains of its gut (still opening in the human
embryo into the anus); and the cerebral hemispheres are masses
of nerve-tissue gradually built up on the anterior membranous
wall of the cephalic stomach, the so-called pallium.

A survey of the accompanying figures will explain this thing
in a diagrammatic way. These figures are taken from the works
of Gaskell and of Edinger,[2] and have been redrawn by Dr. Lud-
lum. They represent the evolution of the nervous system from
the arthropods to the highest vertebrates.

From all this the evidence is clear to me that the corpus
striatum has gradually sunk to a position of infinitesimal im-
portance. It is doubtful, in fact, whether it continues in the
human brain to exercise any functions whatever. If we choose
to regard it as a vestigial organ, we can find plenty of analogies
for such vestigial tissue in the mammalian brain. As already
said, the pineal gland is a vestigial eye, but in spite of the fact
that it ceased long ages ago to exercise the functions of an eye,
it still presents some evidence of retinal tissue in its make up. If
Gaskell is correct, the infundibulum is the old esophagus, but
in spite of the fact that no food has passed through it for untold
æons, it still retains an intimate connection with the pituitary
body; a body which is in no sense a part of the brain, for it con-
tains no brain tissue, but probably represents the coxal glands,
which in the arthropods were located near the mouth opening
and may have had some important function in excretion or
nutrition (a fact which throws a strong light on what we know
now of the pituitary as an organ of internal secretion, influencing
in an occult way nutrition and development). The rhinen-
cephalon, or the brain of smell, has undergone an enormous de-

[2] Structure of the Central Nervous System, Philadelphia, 1890.

generation in the human brain, as anyone can see who compares it with the same organ in the carnivora, or even in the horse or ox.[3] Most remarkable of all, the whole cerebrospinal canal has completely abrogated its original place in nature as a gastro-intestinal tube.

If any one contends that such a metamorphosis is inconceivable, his attention need only be called to what took place in the evolution of a lung-breathing animal from a fish, which breathed in the water by means of gills or branchiæ; and if he wants an example of what nature can do by way of perpetuating organs which during millions of years have become absolutely useless, he need only look at the gill-slits in the human embryo. Surely if nature can preserve the gill-slits of a fish in the neck of a human embryo, she can also preserve the useless remnants of the fish's brain in the broken fragments of the human corpus striatum.

So far from such astonishing metamorphoses being the exception in evolution they are rather the rule. As Johnston says,[3a] both the rise of new structures and the passing away of old ones have brought about shifting of organs which is of great importance in determining the structure of the nervous system. This shifting of organs, and transference of function from one organ to another, has been largely the method by which evolution has proceeded in what is called cephalization or development of the head and brain in vertebrates.[4]

If now we resort to histology, we are helped but little to an understanding of this subject. In fact, we are rather confused. The histology of the corpus striatum is a hopeless maze. No man has ever made much out of it yet, so far as I have been able to ascertain. And no man will ever settle this broad question by

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[3] Sisson, Anatomy of the Domestic Animals, pp. 837, 844, and 848.

[3a] Nervous System of Vertebrates, p. 69.

[4] Gaskell's theory of the origin of the vertebrates has been criticized and rejected by some embryologists because it contravenes the principle of the three primary layers, the epiblast, mesoblast, and hypoblast. His theory, it is argued, makes the impossible claim that what was hypoblast in the arthropod has become epiblast in the vertebrate. Gaskell confutes this criticism, but the argument is too long and technical for me to attempt to reproduce it here. It can be read by anyone interested, in chapter XIV of his book. He says by way of conclusion: "Of recent years grave doubts have been thrown upon the validity of this theory (*i. e.*, of the three primary layers) . . . So much is it now discredited that any criticism against my theory, which is based upon it, weighs nothing in the balance against the positive evidence of recapitulation already stated," p. 486.

peering through a microscope.   Van Gehuchten says that we are
ignorant of the morphological connections of the basal ganglia,
just as we are ignorant of their functions.   Wernicke believed
that the gray matter of the caudate nucleus and of the external
segment, or putamen, of the lenticular nucleus gave origin to
nerve fibers analogous to those which come from the cortex of the
cerebrum.   This might merely indicate, if Wernicke is right, that
the corpus striatum still preserves vistigial tissue which is a re-
minder of the functions it once preformed as a primitive brain
mass.   It need not indicate that these fibers retain any of their
primitive importance.   Cajal says that fibers from the cerebral
cortex pass through, but not to, the lenticula, to be distributed to
inferior parts of the cerebrospinal axis; in other words, they
have nothing to do with the lenticula.   Edinger points out that
some fibers connect the caudate nucleus and the lenticular nucleus
by passing through and across the internal capsule.   Such fibers
may merely indicate the original connection between these two
fragments of the corpus striatum, and may have little if any
functional importance.   There is no evidence of any direct con-
nection between the brain cortex and the corpus striatum.
Edinger describes fibers from the brain cortex which pass through
the globus pallidus and are gathered up in the ansa lenticularis
beneath the lenticula—in other words they merely pass through
the lenticula.   Histology has its place, but conclusions drawn
from it as to function may be most misleading.   I have already
illustrated this fact when speaking of the pineal eye, which cer-
tainly has not seen the light for untold ages.

Another fact, of great significance, is shown by Johnston[5] in
the histology of the striate body in the fish; namely, that the
striate body of the fish is closely connected with the olfactory
brain or rhinencephalon.   There is nothing like this found, so
far as I know, in the human corpus striatum.   It has apparently
long since lost any such connection.

When we turn to experiments for light upon the functions of
the striate body, we are not much better off.   These experiments
have usually been performed by electrical excitation.   Ferrier,[6]
who reviewed this whole subject, including his own experiments

[5] *Op. cit.,* p. 290.
[6] *Functions of the Brain,* pp. 409, 410.

as well as those of others, inclines evidently to the belief that the effects produced by irritating the basal ganglia are due, not to the irritation of the ganglia themselves, but to the irritation radiating to the fibers of the internal capsule. He holds that, provided the cortical motor centers and their pyramidal tracts in the internal capsule remain intact, the ganglionic masses of the corpus striatum may be destroyed, or at least extensively injured, without giving rise to appreciable symptoms. This puts their functions far below par. Ferrier combats Bechterew's fanciful idea that there is somewhere in these basal ganglia an emotional center—an idea of Bechterew's which has been much exploited to explain the automatic laughter of pseudo-bulbar palsy. But Ferrier apparently believes that there is a difference between the higher and lower animals, and that in the rabbit, for instance, the corpus striatum may still perform some functions. This supports the idea that it is a deteriorating organ, for the rabbit is low in the scale of mammalian animals, and may still have a corpus striatum that is worth something to him.

The most recent experimental work on this subject is that which has been done by Kinnier Wilson—a piece of work which is praiseworthy, and is also significant because of Wilson's prior article on diseases of the lenticula.[7] He is able apparently, as a result of his experiments, to claim no more for the corpus striatum than that it exerts a " steadying " effect upon the motor neurons in the internal capsule. This is the only comfort he can get in support of his peculiar views about the pathology of the lenticula. But far more important, Wilson concludes that " there is no vestige of evidence that in man the corpus striatum is capable of assuming a long-lost function and of acting vicariously for the motor pallium. Its true motor function has gone never to return." He further says that when the " superman " is finally evolved, he will probably have no corpus striatum.

By way of a mild criticism of Wilson's conclusions I should like to ask what is meant by a " steadying " or " toning " effect? The term is novel to me. Is it possible that one neuron needs another neuron to stand alongside of it and keep it toned up? If that is so, what keeps the toner toned up? Such a conclusion seems like an endless chain.

[7] Experimental Research into the Anatomy and Physiology of the Corpus Striatum. Brain, Parts iii and iv, 1914.

From this review of the morphology of the corpus striatum I am led to the opinion that the striate body in the human brain is a vestigial organ, representing the original fore-brain mass in the earliest ancestral types of the vertebrates. It is a little played-out fishes' brain, a submerged brain, broken into two fragments, lying deep in the cerebral hemispheres, which have been developed over it in the original pallium, or membranous wall of the fore-brain vesicle, and have completely usurped its functions and added immensely to them. The difference between the two is the difference between the human brain cortex, on the one hand, and the supra-esophageal ganglion of a crab or a spider, on the other hand. They lie at the extreme poles of the evolution of the nervous system.

The bearing of this demonstration on pathology remains to be discussed—but time will only allow me to make a brief statement of my views in a few general propositions. I have gone over a series of 10 or 12 brains in my own collection at Blockley, but I do not intend to bore you with case reports.

First, I hold broadly that the symptoms caused by lesions of the lenticula are the symptoms merely of various affections of the fibers of the internal capsule. There is no such thing as a lenticular syndrome properly so-called.

Second, the lenticula derives its sole importance in these cases from its contiguity to the internal capsule, and from the blood vessels which run into and through it—vessels which are very prone to be the seats of hemorrhage or obstruction.

Third, when such lesions occur on both sides (that is, when both lenticulæ are involved), especially in progressive or successive attacks, there is produced the condition known as pseudo-bulbar palsy, which is properly a bilateral capsular syndrome. Nothing is to be gained by renaming it "progressive lenticular disease," because the mere renaming of a thing does not add a whit to our knowledge of it.

Fourth, pseudo-bulbar palsy has many varieties, and not a few aliases, but its main features are dysarthria, dysphagia, automatic emotionalism, and various affections of the motor paths to the upper and lower limbs. These motor paths may be partially or almost completely paralyzed, or only paretic, and the limbs may exhibit various motor disorders, such as tremor, spasticity, athetosis and even incoördination. These varieties depend upon the

degree of involvement of the motor fibers in the internal capsule, whether they are totally paralyzed, partially paralyzed, or irritated and in other ways disordered in their functions and nutrition by a disordered blood supply. There is no proof that one set of fibers is needed to keep another set of fibers in tone; it is more probable that a deranged blood supply accounts for the various freaky symptoms, which are seen in these cases. The reflexes may, or may not, be affected, according to the degree of involvement of the pyramidal tracts.

Fifth, dysarthria in these cases is caused by involvement of the motor tracts in the capsule running from the cortical speech centers above to the ponto-bulbar nuclei below. The facio-oro-lingual center in the brain cortex is probably located near the foot of the ascending frontal gyre, but the exact position of its descending tracts in the internal capsule is not so definitely known; they are probably placed well forward in front of the knee. The claim that the striate body may be a coördinating center for speech is to my mind entirely fanciful, and is discredited by the morphology and phylogenetic place of that body. It is inconceivable that the fish's brain could have any speech function. Speech is a function of the human brain cortex alone —one of its highest specialized functions. To place any part of it in the striatum is to go counter to all the indications of morphology. It is only the descending tracts from the speech centers in the cortex that are involved in these cases.

Sixth, the mechanism of automatic laughter and weeping is not readily explained, but to attempt to explain it by arbitrarily locating an emotional center in the basal ganglia is, in view of what we have just seen, positively grotesque. Emotion is a form of ideation; it is a cortical function. I grant that if a fish ever laughed, it must have laughed with its corpus striatum; it had nothing else to laugh with; but I do not believe that a man laughs in that way. I have attempted elsewhere to explain this automatic emotionalism by suggesting that it is strictly analogous to other automatic phenomena, as, for instance, the action of a decapitated frog in wiping off a drop of acid from the skin of one leg by using the other foot; or the action of the decapitated rattlesnake, which, if its tail is trodden on, will raise its headless trunk and strike. The various nuclei of the many muscles concerned in the act of laughter have become trained to a coördinated ac-

tion. They may go off, as it were, by themselves when they are cut off from the controlling centers in the brain cortex; and this condition is well presented by lenticular lesions involving the capsule, when such lesions are bilateral.

In conclusion: as I said at the beginning, I have gone far afield; and I realize that I may not very successfully have condensed in a paper of fifteen minutes what it has taken nature whole geological epochs to accomplish. The anniversary of our beloved society put me in a reminiscent mood, and when I got to thinking of the past I did not stop until I reached those halcyon far-off days when the infundibulum was the old esophagus.

THE PSYCHOLOGY OF MISERS

By Charles W. Burr, M.D.

PROFESSOR OF MENTAL DISEASES, UNIVERSITY OF PENNSYLVANIA,
PHILADELPHIA, PA.

The student searching for data to serve as a basis for a classification of men according to mental type, who believes that true insanity is developmental, the symptoms varying with the personality, and that if we had a psychological classification of normal man it would aid in classifying the abnormal, who sets for his task, or rather his pleasure, the reading of lives in expectation of finding scientifically important and interesting matters recorded, and who is trying to discover why individual men and women are what they were and not otherwise, what factors in heredity make them, what elements in environment mould, when they do mould, the immortal, ancestral protoplasm, soon becomes vexed with biographers and autobiographers. Some of the latter, it is true, reveal quite unwittingly traits of character, of which they themselves are entirely unconscious. Thus Herbert Spencer's ponderous autobiographic tomes show him to have been not the modest student he thought himself but one of the world's greatest egotists. Many autobiographers evince a complete faith in their own power, accepting unconsciously, for they are often far from religious and unlearned in scholastic lore, the theological dogma of free will and believing they made themselves and determined their careers, whereas some psychologists at least, even in this day which is trying to persuade itself to believe that all men are mentally and morally equal if only they be given external advantages, especially schooling, think we are what we are because of inherent qualities in the parental germ cell and sperm cell. For the most part books about people are so loaded down with trifling matters of external life, with things that throw no light on the development of the man and his personality, that the psychologist gets but little from them. Further, I must confess that in certain regards we owe more of our knowledge of the

real nature of man, and after all this is psychology, to the artists,
the great poets, novelists and dramatists, than to the technically
educated students of science. I mean of course from the point
of view of what one may call clinical, personal, descriptive, psy-
chology, and not as regards the formulation of scientific theories
as to mental development and action. I mean the difference be-
tween Shakespeare and some of the men who are reading psy-
chology as a major in a university course leading to the Ph.D. de-
gree. The reason is that the great artist like the great man of
science, and there is much more resemblance between the two
than meets the common eye, sees what he looks at, sees things as
they really are. The poet, the mathematician, and the real dis-
coverer in the natural sciences are alike in that all have tremen-
dous power of normal imagination while scientific students of
lower rank, those who become students by accident and do not,
to use a theologic term, have "a call," see only what is pointed
out to them and lack imagination entirely just as the little poet
may appropriate the mechanics of a master's verse but can not
supply a soul. Thus Harrison Ainsworth's novel, "The Life of
Jack Sheppard," mere melodrama as it is and its author far from
being a genius, gives a truer picture of the real criminal, what
his emotions are, what things control his conduct, what his view
of life is, than some learned treatises written by self-styled ex-
perts in criminology which we are compelled to read as part of
the day's work.

In recent years the clinical psychologic study of the dead
has become quite popular but usually the problem has been at-
tacked from the wrong end. Instead of studying a large number
of men of a given type without bias and prejudice and then
drawing a conclusion, the common plan is for an author to as-
sume the truth of a theory and then to search through literature
for evidence in support of it. Because Shakespeare's signature
to his will is tremulous, therefore, say these writers, he had paral-
ysis agitans, therefore he was a degenerate, therefore all genius
is degeneracy; Goethe had an hallucination in early life, therefore
geniuses are all hallucinatory. Examples could be multiplied
indefinitely. Most of the psychological study of the dead has
been in reference to genius, an unconscious tribute to the fact
that the world owes all progress to unusual men, to the real
leaders, and nothing to the mass, to the common people, whom

it is an acquired characteristic of today to endow with all the virtues, including wisdom and clear thinking. The real science of personal psychology, the classification of men, remains almost unknown because so little studied.

The above is preliminary to the statement that in this little study of one particular type of man I have found it difficult, often impossible, to get the facts, *i. e.*, the kind of facts which throw real light upon and explain why any given man is the man he is. My information was of necessity gotten from sources where one does not look for accuracy of statement. All the books about queer people, eccentrics, misers, murderers, monsters, and the like are written solely with a view to entertain, not to instruct, and misers belong to a class about whom serious biographies, poor for our purpose as biographies usually are, are not written.

Let me relate to you briefly the lives of a few misers and then see whether we can draw any general conclusion. Time and space are so limited that I can do no more than catalogue qualities and give incidents which indicate character. In any such study the Dancer family naturally comes first, because they have become immortalized in serious literature and because in them miserliness extended over three generations (a very rare instance of direct heredity of pathological psychological personality) though Daniel was the most notorious, or famous, or infamous; you must choose for yourselves individually which is the most appropriate epithet. The grandfather, father and all the brothers and sisters of Daniel Dancer's generation were alike misers. Of the oldest generation little is known except that they were landholders and ought to have been people of such character as to have been held in esteem and to have had positions of responsibility and respect in their community. They were held in contempt. Daniel was born near Harrow in England in 1716 and was the oldest child. His avarice, it is said, appeared only after the death of his father, from whom he inherited a comfortable fortune. He believed that the old gentleman had concealed more than fifteen hundred pounds in the house and was afraid his brothers would find it and not give it to him, the heir, and consequently kept very quiet for some time about his suspicions, but two years later on removing an old gate, about two hundred pounds in gold and bank notes was found between two

pewter dishes buried under one of the gate posts. The remainder of the hidden money, if there was any, was never found. He lived with his sister, whose nature was like his own. He is particularly interesting to physicians because of his poor opinion of us. Once, if not many times, when his sister was ill he said "all the gentlemen of the faculty are medical tinkers, who, in endeavoring to patch up one blemish in the human form, never fail to make ten." Once he found in the field, or by the road, a dead sheep which he took home and he and his sister made it into meat pies which he said tasted very good. When his sister died he hired another miser, a man much like himself, to be his man and together they used to go out hunting for bones wherewith to make soup. His rooms were never cleaned. He would walk two miles rather than not assist in manuring his own lands and even picked up dung on the common. Curiously enough he had a pet dog, which was fed a pint of milk daily but when the dog was found to be a sheep thief his master took him to the village blacksmith and had his teeth broken off. None of the writers give his reason for doing this; whether he acted in anger or to punish the animal. He never had a light in his house save a candle to see him to bed. Once burglars broke into his house but got little; afterward, however, he sent much of his gold to a safer storage place. Once Lady Tempest, who was always kind to him, sent him a trout stewed in claret. It congealed from the cold and in order to warm it, lest eaten cold it should make his decayed teeth ache, he took it to bed with him and so warmed it. His house was a miserable building, but after his death money was found scattered everywhere. Notwithstanding his extreme avarice he was never dishonest, but absolutely straight in all his financial transactions. He seemed to want gold for the mere pleasure of hiding it, fondling it, playing with it and he would rob one pot to enrich another. He lived all his life in his parental home, but allowed the lands about the house to grow into a veritable wilderness. He seems to have worn one coat for many years and wrapped his legs in straw bands. After his sister's death he had a law suit with his brothers about the inheritance and recovered from her estate 1,040 pounds as the price of board for thirty years and one hundred pounds extra for the last two years, during which he declared she did nothing but eat and lie in bed. He died at seventy-eight years.

William Jennings was born in England in 1701. His father, a very wealthy man, died while having built a magnificent country seat and left the son two hundred thousand pounds. The son stopped all work on the house and dwelt in the basement, the floor of which was some ten feet below the surface of the court. It was divided into three rooms, the furnishing of which cost about twenty pounds. He showed some remnant of family pride in having his meals served in this dismal place on the family plate. His peculiar attitude toward expense was shown by the fact that the food left after a meal was never permitted to be served again nor was it given to the poor but express orders were given that it should be fed to the dogs. He was a constant attendant at the fashionable gambling hells of London, not, however, in order to play but to lend money to the unlucky gamblers, his interest charge being a shilling in the pound daily and he purchased a house in London so that he could be nearer at hand to carry on his money-lending business. He was in no sense a social man, but attracted to him some few people by promising to remember them in his will. He did write a will leaving the bequests but he never executed it and after his death his estate, a little less than a million, came near getting into the chancery court, as two noble families each made claim to it. The matter was compromised. It was said of him after his death that he was never known to do one single charitable act. He showed the real character of the miser in that he kept large sums of money unemployed. It was estimated that for twenty years before his death he lost two thousand pounds yearly by idle money. In one of his houses he always kept twenty thousand pounds in cash and in the other a still larger amount. He died in 1797 in the ninety-seventh year of his age.

James Taylor was born in Leicestershire, started life as a weaver and later became a stock broker, in which business he amassed two hundred thousand pounds. His raiment was ragged, his food indifferent and scanty, and his bed was rags and straw on the bare floor in a house which scarcely protected him from wind and storm. Once he invited his friend Daniel Dancer to dine with him and two banker's clerks to take part in the feast. The acolytes of finance found him on their arrival boiling a single mutton chop in a sea of water to make soup for the feast. While he was out of the room they threw some candle ends in

the pot. The mess was eaten by the two queer cronies, but meeting the clerks later Dancer had them arrested for stealing his candles. History relates, probably as accurately as history usually does, that the men cleared themselves by proving he had eaten the candles and as they had become a part of himself he had not been deprived of them but had simply put them to an unusual use. He always bought a twopenny steak, in the market, a sorry piece, an outside piece, grown black by the wind, fly blown and odorous. He use to say "meat was nothing, unless it smelt as well as tasted." He even drove a hard bargain with the church for the salvation of his soul. He was ill, and fearing death, sent for the proper church officials. He paid them twelve hundred pounds for prayers for the rest of his soul but made them return him a year's interest by way of discount for cash payment. His name therefore appears, or did as late as 1813, on the donation board of the church of St. Saviour in London. He died in 1793.

Edward Nokes was a tinker till six weeks before his death, at the age of 56, at Hornchurch in Essex. Almost the only human attribute he had was his fondness for spirits, of which he drank nearly a quart daily without, however, ever showing signs of alcoholic merriment. He fed himself, his wife, and children on offal and washed his shirt in urine. When any of his children died he had a deal box made and carried it on his shoulder to the place of burial and returned home careless and unconcerned. Shortly before his death he gave orders that his own coffin should have no nails in it and that no mourning should be worn at his funeral. On the contrary the pallbearers and undertaker were garbed in striking fashion. He kept large sums of money in a bowl hid in a brick kitchen. Though his surroundings at death indicated abject poverty he really left between five and six thousand pounds which his long-suffering wife, in the absence of a will, inherited.

One is tempted to believe that the next of my heroes is mythical or at least the victim of imaginative and lying tongues, so strange and varied is the history recorded in the books. I have not been able, in the time at my disposal, to trace his history to its original source and give it to you for what it is worth, assuming no responsibility for its accuracy. John Owen lived in London before there was any bridge over the Thames. He

rented for many years the right to ferry people from Southwark
to the city by boats. Though he became very rich he lived as
though in poverty. He had a daughter, pious and beautiful (a
heroine can not be ugly, though nowadays she may be far from
pious), and on her he spent money lavishly for education, but
when she grew to womanhood would suffer no man near her.
However, the inevitable happened: a young man appeared and
made quick love to the heroine while the father was gathering
fares on the ferry. Meanwhile things went on, in the place the
girl called home, as usual. The father warmed the family black
pudding in his bosom while rowing and gave it to his family and
servants therefrom. He searched the dung hills at night for
bones to make soup. He ate food his dog refused (dried bits
of mouldy bread). Once, and the thing ended in a tragedy, he
feigned sickness and death to save two days' food, thinking that
while he lay dead his servants would not be so unnatural as to
eat. He told his daughter of the trick and she, though unwill-
ingly, consented to take part. He was laid out for dead, wrapped
in a sheet with one candle at his head, another at his feet, but
his apprentices so far from being saddened by his death were
overjoyed. They skipped, and played and ran as they had never
done before, ate all the food in the house and sent out for beer
and other luxuries. The old man, dumb with amazement and
vexation at the conduct of his servants and at the money loss
from such feasting, rose wrapped in the death sheet and taking
a candle in each hand stalked into the adjoining room intending
to rout the merrimakers out for their boldness, but one of them
thinking he was in very truth the devil come to the world to
welcome his future guest, struck out his brains with the butt
end of a broken oar. The daughter's lover hearing of the death
started for town in such haste that his horse threw him just as
he was entering London and he broke his neck. The girl be-
came bereft of her senses as a consequence of the double tragedy.
The father had been excommunicated on account of the manner
of his life and was denied Christian burial, but the daughter
bribed the monks of Bermondsey Abbey, in the absence of the
abbot, to get him buried. The abbot on his return home discov-
ered what had happened and had the body disinterred, put upon
the back of an ass and asked God to take it where it deserved
to be buried. The ass, evidently a very knowing beast, went

unguided to an execution place, dumped the body under the gallows and went on his way quiet and undisturbed. A grave was instantly made and the body tumbled in and covered with earth. The daughter, being troubled by a multitude of suitors for her hand and fortune, retired to a nunnery and gave her wealth to the church.

Mr. Ostervald, a French banker, though leaving 125,000 pounds, died of want in Paris in 1790. A few days before his death he refused to buy a little meat to make soup saying, "I would like the soup but I have no appetite for the meat, and what would become of it?" At the very moment he had thousands in bank notes hidden in a silken bag attached to his neck. As a young man he saved the corks from the bottle of beer he drank for his supper every night and after eight years sold them and with this money started to make his fortune by successful stock jobbing.

Mr. Foscue was farmer general of Languedoc. He made much money out of the collection of taxes and suddenly was ordered by the government to raise a large sum of money at once. He pleaded poverty, and, fearing his house would be searched, dug a cave in the wine cellar and hid the money in it. Soon afterwards he himself was missed, sought for but not found. Later his house was sold and in altering it or tearing it down the workmen discovered the door leading to the cave. On breaking it open—it was closed by a spring lock—they found the dead body of Foscue lying among the vast riches he had accumulated.

Thomas Milbourne was not a true miser. He spent nothing on himself, though he gave much to others. He started life as a farmer's servant and saved two hundred pounds. He purchased a small farm in Cumberland, lived alone, and did all his work himself. He clothed himself in rags, never shaved, and the contents of his house were sold at his death for less than ten shillings, though his estate amounted to one thousand pounds. Many promissory notes were found and it was discovered that he had lent many of his neighbors money on the easiest terms and never pressed anyone for payment. He had, however, the miser's habit of hiding money. He died in 1800 between seventy and eighty years old.

Samuel Stretch was another example of a man who deprives himself of things in order to obtain, by money, a posthumous

fame or at least remembrance. He died at Madeley in 1804
but at what age I have not been able to discover. In early life
he served as a private in the army and took part in some real
fighting. His occupation in late life was to carry letters and
parcels to the towns surrounding Madeley and to do any little
commissions his neighbors might give him. For years he ad-
mitted no one to his hut and lived entirely alone. His clothing
was in tatters and over his shoulders he carried a bag into which
he put bones, bits of leather, paper, rags and indeed all kinds
of trash that he found in his wanderings. His linen consisted
of two old shirts and a pair of sheets. He amassed quite a large
sum of money but the exact amount is not recorded. He left
money to purchase an additional bell for the village church, and
set aside sums to pay for having it rung at nine o'clock on sum-
mer nights and eight in winter, a bell for the free school, an
addition to the salary of the organist, to enlarge and repair the
almshouse, and for clothing and educating two poor children and
to his relatives he left two shillings and six pence each.

Thomas Cooke was born near Windsor in 1726 and died in
London 86 years later. He is of particular interest to medical
men because he was a classical example of dispensary abuse.
All the gentlemen interested in reform of hospitals for the good
of doctors' pocketbooks ought to read his life. They could quote
him in their papers and speeches. His father was a wandering
fiddler who died when Thomas was a little child, leaving him to
the care of a grandmother. As a youth he showed one good
quality: he lived on bread, water and apples to save money to
pay a village schoolmaster to instruct him in reading, writing
and arithmetic. He was employed as a porter by a dry salter
and did his work so faithfully that his employer helped him to
get a place as exciseman. After his appointment, the govern-
ment sent him to oversee a paper mill as tax master and he
studied the business so well that he soon found the proprietors
were cheating the revenue. He said nothing till the master of
the mill died; then he interviewed the widow, told her of the
fraud and that he alone knew of it but, that if the government
learned of it all her property would be seized to make up the
loss, whereas if she would marry him, he would not reveal the
secret. She married him. He continued the business but not
successfully and then went into the sugar trade. Though he

was a successful man in a worldly sense, leaving at his death
more than 127,000 pounds in consols, his whole life was one of
penury, petty saving, and petty trickery. He made it a habit in
order to get meals for nothing, to fall in a pretended fit in front
of a house at dinner time and on recovering he would naturally
be invited to share the meal, which he always did after the proper
amount of protestation. Often he would pretend to these kind
people that they had saved his life, would make a great fuss over
them and tell them he intended to remember them or their chil-
dren in his will. Not a few of these people learned he was rich,
did not object to being remembered in wills, and thought to in-
crease their chances by making gifts to him. He received in
this way geese, turkeys, roasting pigs, hares, pheasants, and some-
times a dozen of fine wines. One man, a poor relation, occa-
sionally sent him small presents of butter. This angered Cooke
who said to him "why send me such driblets, you who are to get
thousands and thousands at my death. Send me a firkin." The
firkin and several more were sent, but neither this legacy nor
any of the others came to reality. He used ink to black his
shoes but never paid for it; instead he begged it, sometimes pil-
fered it, carrying a bottle with him for the purpose. He was
very fond of cabbage and used some ground around his house to
grow it on, getting the manure by going out in the road with a
little shovel and basket and gathering up the horse droppings.
His parsimony toward his wife, who had been well cared for by
her first husband, caused her death. He had one healthy pleas-
ure. He was fond of horses, but fed them largely at other
people's expense. He was a good talker and an interesting man
and as he rode along the road he made it his business to meet a
farmer driving a load of hay. He would get in conversation
with him and meanwhile his horse would make a good meal of
hay. Like many men shrewd in petty ways, he was easily de-
ceived in matters out of his own line. Thus once when his
horse was sick he was too mean to pay a horse doctor and asked
advice of a quack who told him he must take thirty onions, drill
a hole through each, put them on a string, put the necklace
around the horse's neck and let it stay there. The expense of
thirty onions was too much: he bought fifteen and when after many
days, they had served their purpose, he took them to the servant
and ordered her to make an onion porridge for the day's dinner.

His cook was well trained but that time she rebelled and the porridge was not made. He had no feeling of mercifulness towards animals and once purposely and horribly maimed a horse he intended to buy in order to reduce its price, pretending it had been injured by its own viciousness. Numberless stories are told about him, all illustrating his skill in petty scheming to save or make small sums of money. Doctors especially he tricked and cheated, among others the celebrated Dr. Lettsom. Even while on his death bed he quarreled and wrangled about medical fees. He asked the physician in attendance to tell him how long he might hope to live. The reply was six days. He flew into a real or pretended rage and blackguarded the doctor for taking his money when that was all he could do.

One of the characteristics of misers is the lack of the social sense, the self-centeredness, the absence of the need of companionship. It is true that not a few of them have been married, but in all instances the wife seems to have been taken simply because she was cheaper than a servant or because her money was desired. It is rather remarkable, therefore, that there is alleged to have existed in London at one time a miser's club called the "split farthing club." As everyone knows, London is the club city of the world and clubs and societies of all kinds of impossible people for all kinds of impossible purposes flourish there, so that one need not be astonished at anything in the club line. I do not wish to be held responsible for the trustworthiness of my source of information concerning the matter but refer you to "A Compleat and Humorous Account of all the Remarkable Clubs and Societies in the Cities of London and Westminister" published in London in 1756. You must judge for yourselves whether the book was written in good faith or whether it is an example of labored and, in places, rather dirty wit. I have a great deal of doubt about there ever having been a "split farthing club" because it would be entirely out of consonance with the character of a miser to have much to do with anyone in any social way. They have almost the egoism of the insane who, barring the epileptics, never combine either for social intercourse or to conspire to injure.

Neither intellect nor education prevent the development of the miserly instinct. The tinker and the man of science alike fall victims. No veneering of acquired characteristics can prevent

the real man showing through. Even physicians may suffer from
the disease, but I am glad to say that the number is small.
Jacques Dubois, alias Jacobus Sylvius, immortalized in the Sylvian
fissure is the most notorious example. I crib my biographic
sketch from James Moores Ball's ".Andreas Vesalius the Re-
former of Anatomy." Sylvius was the most popular medical
teacher in Paris when Vesalius was a student there—popular
only as a teacher not as a man. He was born near Amiens in
1478. As a young man he was noted for his scholarship, espe-
cially in philology. He gave up the study of languages to make
money at medicine. There seems to have been more money in
physic in those days than now. He was the first man in France
who taught from the cadaver, but he regarded Galen's writings
as infallible and if the cadaver showed structures unlike Galen's
description, the fault was not in the book but in the dead body
or perchance, and this argument was not made by Sylvius alone,
human anatomy had changed. Sylvius was a man of vast learn-
ing but he was in character contemptible, rough, coarse and
brutal. He never used a fire to warm himself but took violent
exercise in his room instead. Once in his life his friends found
him hilarious. Asked the cause, he said he had just dismissed
his "three beasts, his mule, his cat, his maid." He was notori-
ously rigid in making his students pay their fees. He was violent
and vindictive in argument and jealous of the fame attained by
others. In later years he was opposed by Vesalius and spoke
of him, not as Vesalius but as Vesanus, a madman. He is said
to have been the first man who used colored injections in anatom-
ical investigation. He was thought to have amassed great
wealth, but little was found after his death and what there was
was hidden in secluded places. Years after his death when his
house was torn down many gold pieces were found. He died in
1555 in the seventy-seventh year of his age and was buried, as he
had wished, in the pauper's cemetery. His epitaph runs in
English.

"Sylvius lies here, who never gave anything for nothing:
Being dead, he even grieves that you read these lines for nothing."

Let me refer to a man who endured the reputation of being a
miser in order to save money to found and aid charitable institu-
tions. He was Thomas Guy, founder of Guy's Hospital. He

was the son of a lighterman and coal dealer in London and was himself bred (I use the word the old books use) a bookseller. He began trade in London with 200 pounds. He speculated in South Sea stock in 1720 and made an immense fortune. He always dined alone, using a proof sheet or a newspaper for a tablecloth. Vulture Hopkins called on him once, saying he wanted to learn frugality from him. " We do not need a light to talk about that " said Guy and put the candle out. Hopkins left, saying he needed no further instruction. But Guy was not in any sense a miser, notwithstanding the mean life he led and the personal sacrifices he made. He saved for charity. While still living he gave 18,733 pounds to found Guy's Hospital and left it when he died 219,499 pounds. He gave much money to other charities and no hidden gold pieces or bank notes were found in rat holes, buried pots, or the like. He died in 1724, aged eighty-one years.

I could continue indefinitely relating stories, for literature is full of accounts of these people but it would be mere repetition. In all there is the same clinical picture, in all there is one and the same type of man or more rarely woman. Possibly in the future, if feminism becomes a reality and not a crazy dream, the rareness in women may cease. When we try to learn the true psychology of the miser, we find there is but little data: authors are so interested in the melodramatic and the eccentric, in the queer and the squalidly picturesque events of the lives that they pay attention to nothing else. I have not been able, *e. g.*, to find a detailed and accurate account of the boyhood of any miser and yet such knowledge is of vital importance in studying the psychology of any type of man, because it is probable that if we really knew a boy's mental makeup soon after puberty, if we could see into his mind at this time, when he breaks through the shell of childish, unconscious egotism which has kept him a being detached from the outside world, a thing separate and apart, unknowing that he has a personality, and realizes, as every thinking boy does (the others are not worth bothering about) that he is a part of and yet distinct from the universe, we could foretell his mental history for the rest of his life, because during this time his hitherto formless mind rapidly takes shape, becomes crystalized. The mental potentialities which determine character are all present in boy-

hood, but we are not alert enough to grasp their significance when
they now and again come fleetingly to the surface and hence
can not tell which will remain potential, which will become kinetic.
Furthermore though all misers are more than superficially alike,
all have the same predisposition and offer the same soil, all have
the passion for acquiring useless money and almost all the habit
of hiding it, it is probable that there are several exciting causes
and what they are it is usually impossible to discover. Certainly
a person who presents any characteristic all his life differs some-
what from the one in whom it appears only in maturity and yet
this difference is just what we find in misers. Several of them
as youths and young men showed no sign of abnormality and
then suddenly underwent, in the absence of any known reason, a
complete change of manners, habits, disposition, just as the
insane do, while others showed miserliness even during adoles-
cence. In some cases the explanation doubtless is merely that
the development of character was slow, but in any disease of
sudden onset we expect to find an external exciting cause.
Mental ability does not protect against miserliness, for there have
been many men of mental power far above the average who have
suddenly lost interest in intellectual pursuits, without any other
evidence of insanity, and have lived the lives of misers. So
scanty is our data, therefore, that to draw conclusions about these
people we must often, and sometimes doubtless erroneously, draw
inferences from trifling incidents because more serious and im-
portant things are not recorded.

In classifying the type it must be remembered that a miser is
not merely a man extremely stingy: miserliness is not mere
avarice. Again a man may, as in some of the cases related, de-
prive himself of every thing except the barest necessities, even
live in filth, and yet not be a miser, because his motive is purely
altruistic, purely a desire to do good during life or after death.
Nor have all such men had fame as their motive. Some of them
have been careless and unconcerned as to whether or not they
were remembered or forgotten and acted from motives of the
purest generosity or from an imperative sense of duty. A
genuine miser is a man who collects money for the mere enjoy-
ment of its possession, not for what it buys either in pleasure or
power, but just as a magpie collects things. Indeed a fanciful

psychologist might explain miserliness on the grounds of atavism and say that it was a reversion to ancestral type, a throw back to our alleged bird ancestors, just as some weakly imaginative criminologists explain crime as a reversion to the primitive man. The one is no more unjust to the magpie than the other is to the savage.

Several things strike one in studying these people, especially the great age to which many of them live. Indeed if anyone wanted an argument to prove that we of to-day have become too dainty and nice and ladylike in claiming that clean food and plenty of it, clean houses with much light and ventilation, frequent bathing, in short all the things the worshipers of the god hygiene demand, are necessary for the maintenance of health and even of life and that rather rougher life would strengthen the race he has at hand a plausible argument in the longevity of misers. Of course the real explanation is that only the sturdy can be misers and survive. Their longevity does prove, however, that given a man of strong constitution he can survive under the hardest conditions of life. It does prove that congenital ability to resist stress has more to do with long life, not with the mere saving for a few years of useless lives, than any external circumstance. Surely few men leading the most hygienic and sheltered lives, and the terms have unfortunately become in the minds of many people synonymous, live as long as many misers who expose themselves to so many of the evils that we are taught always kill.

Social standing has no bearing on the causation of miserliness, since its victims are found in all ranks of society. Children of rich and poor, learned and unlearned, of good and bad all alike may come to the same end and disbelievers in heredity may use this as an argument but they should remember that externals play little part in heredity. Need of money seems rarely if ever to be an exciting cause in starting from necessity what later becomes a fixed habit. That the condition is pathological goes without saying but it is not an insanity in the technical, restricted meaning of the word. Though it often leads to a blunting of the moral sense and even to cruelty it does not lead to intellectual stupidity nor to a delusional state of mind, though it narrows the circle of the intellectual life sometimes almost to a point, to one

idea. It is not an obsession because the obsessed are affected against their wills, fight the obsessions and are made unhappy by them, while misers enjoy. It is in a certain sense and to a degree a perversion of the esthetic sense, as is shown in the pleasure obtained in eating decayed food, and the enjoyment from shivering in a freezing room, and is in so far somewhat analogous to sexual perversion. That is to say, misers get pleasure from sensations which give the normal man pain. For example the man who washed his shirt in urine did not do so for economy's sake—water is too cheap—but I suspect he got a pathological pleasure from the urinous odor. This does not mean sexual pleasure, though the disciples of Freud would probably so interpret it. Miserliness differs, of course, from the true insanity in which there are delusions of poverty and the patient thinks he has not the wherewithal to get his bread.

I have tried to learn—because I believe that all constitutional disease stamps the external anatomy with its individual hall mark, only our eyes are not sharp enough often to see it—whether there is a characteristic physiognomy in misers, but without success. Most of those pictured in literature lived before the days of photography and the artists who drew the pictures to illustrate articles about them were more interested, I suspect, in creating striking illustrations and showing the melodramatic dirtiness of their clothes than in making physiognomonically correct likenesses. Of course in those who were so celebrated as to be known to the people the pictures had to be more or less lifelike. The only conclusion that one can draw is that misers, like most abnormal people, do have casts of countenance which are unlike the ordinary types of faces. Many of them have the same look of furtive intensity that is common in the paranoiac, the religious maniac, and in many other dwellers in the borderland of insanity. They are almost all thin but often wiry. They are long faced and may have high or sloping foreheads. Their noses are frequently long and seldom broad at the opening of the nostrils.

In one minor mental characteristic they often resemble a certain type of chronic maniac in possessing a cutting, sarcastic and cruel sense of wit. Doubtless many of the witty sayings attributed to them are apocryphal, but many are true and even the false ones show that unconsciously the public have learned to associate a certain form of wit with miserly characteristics.

REMARKS ON THE CENTRAL REPRESENTATION OF SENSATION

By William G. Spiller, M.D.

PROFESSOR OF NEUROPATHOLOGY IN THE UNIVERSITY OF PENNSYLVANIA,
FOREIGN CORRESPONDING MEMBER OF THE NEUROLOGICAL SOCIETY OF
PARIS, CORRESPONDING MEMBER OF THE SOCIETY OF GERMAN
NEUROLOGISTS AND OF THE SOCIETY FOR NEUROLOGY AND
PSYCHIATRY IN VIENNA

It is my object in this paper to present from personal observations extending over a considerable period certain facts relating to the representation of sensation in the spinal cord and brain. There will be discussed:

1. The location within the spinal cord of the fibers of pain and temperature and the importance of this location in surgical attempts to destroy the fibers of pain.

2. The separate course of pain and temperature fibers within the central nervous system certainly as high as the upper part of the pons and cerebral peduncles and presumably higher.

3. The presence of only pain and temperature fibers in the spinal root of the fifth nerve.

4. The separation of fibers of pain in the spinal root of the fifth nerve from fibers of temperature. This being true the assumption may be entertained that fibers of pain elsewhere in the central nervous system, though closely associated with fibers of temperature, do not occupy identical positions.

5. The possibility of fibers of heat having a separate situation from fibers of cold sensation.

6. The importance of the tractus spinothalamicus et spinotectalis as regards sensation, and the course of this tract so far as it is known. Evidence on this subject afforded by clinico-pathological investigation.

7. The representation of the three divisions of the trigeminal nerve in the spinal root of this nerve.

8. The representation of pressure sensation of the face in the facial nerve.

9. The position of sensory fibers within the inner capsule and the possibility that the different forms of sensation are separately represented in the parietal lobe.

1. The Location Within the Spinal Cord of the Fibers of Pain and Temperature

It seems probable that the fibers of pain and temperature sensations within the spinal cord are contained within the tractus spinothalamicus et spinotectalis. A valuable case for determination of this question was one that occurred in my service at the Philadelphia General Hospital and was reported by me in 1905.[1] A small tubercle was found in the right lateral column at the extreme lower end of the thoracic cord, involving the area of Gowers' tract and the region median to it. About one half to one inch higher another small tubercle was found involving the left tract of Gowers and the adjacent region in which is contained the tractus spinothalamicus et spinotectalis. Sensation for touch was normal or nearly normal in the lower limbs, but sensation for pain was abolished or almost abolished in these parts. Sensation for temperature was almost lost in the lower limbs below the knees, and much impaired in the thighs and lower part of the trunk. The conditions were changed after a fall down a flight of stairs.

Another case[2] under my observation which showed that the fibers of pain and temperature must be represented in the anterolateral regions of the cord was one of thrombosis of the cervical anterior median spinal artery. Sensations of heat, cold and pain were greatly affected in the left lower limb and both sides of the trunk as high as the first rib on the left side and as high as the second rib on the right side. The anterior portion of the spinal cord in the cervical region was destroyed, and the fibers of Gowers' tract and of the tractus spinothalamicus et spinotectalis were implicated. The much greater escape of the right lower limb is to be explained by the posterior position of the fibers in the lateral column from the lower limbs. The degeneration was not equally intense in the anterolateral columns of the two sides. The lesion involved only the anterior part of the crossed pyramidal tracts and only slightly, and thus the tractus spinothalamicus et spinotectalis was implicated on each side in the lesion.

[1] Spiller, Journal of Nervous and Mental Disease, 1905, p. 318.
[2] Spiller, *ibid.*, 1909, p. 601.

Somewhat contradictory to the view expressed above is the experimental work of Karplus and Kreidl.[3] These investigators found that division of both halves of the cat's cord at different levels did not greatly impair pain sensation, and they concluded that the gray matter of the cord must play an important rôle in the conduction of sensation. We have, however, no evidence that in man long tracts exist in the spinal gray matter.

It thus seems probable that the fibers of pain and temperature occupy the tractus spinothalamicus et spinotectalis. In the spinal cord this tract is interior to Gowers' tract. In division of the anterolateral column of the cord for the relief of pain it is necessary that this tract should be divided, otherwise pain conduction may not be destroyed. The cut therefore must not be too superficial.

The literature fully justifies the assumption that the fibers of pain and temperature are situated in the antero-lateral columns.

2. The Separate Course of Pain and Temperature Fibers Within the Central Nervous System

The fibers for the conduction of the various forms of sensation from the limbs, trunk and face are distinct from one another in the central nervous system probably as high as the optic thalamus, certainly as high as the upper part of the pons, as shown by an important case studied and first reported by me in 1909.[4] The case was supposed to be one of multiple sclerosis. The symptoms which are of interest as regards sensation are as follows: The man had entire loss of sensation for heat, cold and pain on the entire right side of the body including the face as well as the limbs. He had slight impairment of sensation for heat but not for cold over the left forehead. Tactile sensation was entirely normal over the entire right side in the parts in which temperature and pain sensations were lost, and sense of position was promptly recognized in the right hand. Tactile sensation was entirely lost in the left side of the face but only in the distribution of the fifth nerve; pain and temperature sensations were normal in this region, excepting the slight impairment of heat sensation in the left forehead. The tactile loss did not extend over the scalp behind a line drawn vertically to the ear, or into the

[3] Karplus and Kreidl, Archiv für die ges. Physiologie, Vol. 158.
[4] Spiller, Review of Neurology and Psychiatry, February, 1910.

distribution of the cervical nerves on the left chin. Deep pressure was felt below the left eye, but it was not felt above the left eye. When the mouth was opened the jaw deviated markedly to the left. The left temporal and masseter muscles were completely paralyzed, and there was much flattening in the portion of the face normally occupied by these muscles, presumably from atrophy.

There was therefore the dissociation of sensation of the syringomyelic type (preservation of tactile sensation and of sense of position, loss of pain and temperature sensations) on the entire right side of the body, including the face and limbs, with an inverse type of dissociation of sensation to that of syringomyelia (preservation of pain and temperature sensations, except of heat sensation over the left forehead, with loss of tactile and pressure sensations, except of deep pressure sensation below the left eye, strictly confined to the distribution of the left fifth nerve, and with loss of function of the motor portion of the left fifth nerve.

It seems probable that the lesion in this case was in the left tegmentum of the pons. It implicated the central fibers of pain and temperature sensations coming from the entire right side of the body, probably those from the trunk and limbs being contained within the tractus spinothalamicus et spinotectalis within the left side of the pons, and those from the face possibly in the central tract for the face fibers nearer the raphe, as the central tract of the trigeminal nerve in the medulla oblongata is believed by some to be situated a little in front of the hypoglossus nucleus; but it seems improbable that the fibers of temperature and pain from the face should occupy a central tract distinct from that which contains the similar fibers from the trunk and limbs. Head and Holmes[5] evidently believe that one central tract contains both sets of fibers. They say: "All impulses capable of generating pain become grouped together in the same path, and can be disturbed, simultaneously by an appropriate lesion of the spinal cord." What is true of the pain fibers from the body it seems to me probably is true also of the pain fibers from the face. Head and Holmes say that in the brain stem on their way to the optic thalamus "impulses underlying sensations of pain, heat and cold seem alone to run unaltered between the upper end of the spinal cord and the optic thalamus. They receive the ac-

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[5] Head and Holmes, Brain, Vol. 34, 1911.

cession of the regrouped secondary impulses from the face, which cross to join the specific paths for pain, for heat or for cold." Thus they imply that pain impulses from the face join in the same tract those from lower levels.

The lesion, in the case I am describing, involved the left sixth nerve and the left acoustic nerve or its central tracts passing to the right side of the brain stem. It involved completely the motor portion of the left trigeminal nerve in or near the motor nucleus; it involved also all the fibers of touch in the left trigeminal nerve, and slightly those of heat coming from the left forehead. The sensory root of the trigeminal nerve divides soon after entering the pons; some of its fibers pass a short distance upward to terminate in the sensory nucleus within the pons, whereas many of the fibers from this root pass downward into the medulla oblongata near the periphery of the pons. The ascending fibers probably are those of touch, and were implicated, together with the motor fibers of this nerve, in the lesion; whereas those which descend near the periphery of the pons probably are concerned with temperature and pain sensations, and these evidently were not implicated in the lesion. The central fibers from the nucleus accompanying the spinal root of the trigeminal nerve cross the raphe at different levels, and were not seriously implicated in the lesion. Whatever explanation may be offered for the peculiar sensory disturbance in the distribution of the left fifth nerve, it seems clearly demonstrated by this case that the tactile fibers separate soon after entering the pons from the pain and temperature fibers of this nerve.

The complete paralysis of the motor fibers of the left fifth nerve places the lesion, if intramedullary, clearly at the level of the entry of this nerve into the pons, as the motor portion has no descending root. That the lesion must have been intramedullary is shown by the other symptoms. The escape of sensation in the left side of the face, except for tactile irritation, shows that the whole fifth nerve was not implicated. The motor nucleus lies median to the sensory nucleus in the pons. The only possible conclusion is that the motor part of the fifth nerve was implicated with the central tract for tactile sensation median to the position of the sensory nucleus and the descending spinal root. This conclusion seems almost as positive as though a microscopical examination had been made. A lesion in the left tegmentum of

the pons would therefore explain the symptoms of the left side of the face mentioned, it would not have to extend far downward to implicate the left sixth nerve (for this nerve also was affected), and it would implicate the central tract for the fibers of pain and temperature supplying the right side of the body and face.

What I especially wish to emphasize is that this case demonstrates that the central fibers for touch in the face are distinct from those for pain and temperature in the face as high at least as the upper part of the pons, and it is presumable that the same condition exists higher than this level.

3. The Presence of Only Pain and Temperature Fibers in the Spinal Root of the Fifth Nerve and (4 and 5) Their Separate Representation

It is evident that the descending spinal root of the fifth nerve contains only fibers of pain and temperature, so much can be inferred from this case, but more conclusive as regards this point are the cases of occlusion of the posterior inferior cerebellar artery with microscopical examination. The descending spinal root is implicated in the lesion in these cases, pain and temperature sensations are often affected in the fifth nerve distribution on the side of the lesion, but tactile sensation in this distribution remains intact. Pain and temperature sensations are not invariably lost together from a lesion of this character. In one of the cases of occlusion of the posterior inferior cerebellar artery reported by me[6] in 1908 pinprick sensation in the face was normal, and a part of the spinal root of the fifth nerve was not implicated in this lesion. Unfortunately temperature sensation was not tested in this case, as the man lived only a few days after entering the hospital, and this test was neglected at the first examination. It is possible that temperature sensation might have been found altered. I make this statement because of a case I have studied recently in which pain sensation in the distribution of the fifth nerve was lost when temperature sensation in the same distribution was intact. This case demonstrates that the fibers of pain sensation must be distinct in the spinal root of the fifth nerve from those of temperature. This conclusion is of great importance, as when a central lesion disturbs pain sensation

[6] Spiller, Journal of Nervous and Mental Disease, 1908.

anywhere it usually disturbs temperature sensation also in the same parts, and if the conclusion be justified that pain and temperature fibers in the spinal root of the fifth nerve occupy different areas, it is presumable that the fibers conveying these sensations from all other parts of the body are also separately situated in the central nervous system. In the case of disturbed sensation in the two sides of the face referred to at length above, slight impairment of heat sensation but not of cold was detected over the left forehead. In this distribution pain sensation was not altered. We often find that cold sensation may be recognized when heat sensation is lost from a lesion of the central nervous system, or vice versa, or both forms of temperature sensation may be recognized only as one, either heat or cold.

One patient of mine, for example, who had symptoms indicative of a lesion of the brain stem below the optic thalamus complained of his left lower limb being so cold that he "thought it would freeze," and his wife would wrap him in blankets. When he took a cold bath the cold water felt like boiling water to the left lower limb and the left side of the trunk. Warm water in these parts felt hot. When I applied a cloth wet with cold water from the spigot to the left foot he said it felt as though it were burning the foot and he jerked the foot away. Pinprick in the left foot produced a sensation that he could not distinguish from burning or tingling.

I am inclined to believe not only that fibers of temperature sensation are distinct from those of pain, but that there may even be fibers for the conduction of heat stimuli distinct from those for the conduction of cold stimuli. This may seem an unreliable refinement of dissociation, but we assume that there are fibers in the central nervous system elsewhere highly differentiated for special function. We assume, for illustration, that there are the so-called "pupillary fibers" in the optic nerve which convey impressions of light stimuli that cause contraction of the pupil and are not recognized as light sensation. We are taught also that the pupillary reaction is not always the same for stimulation by daylight as for stimulation by electric light. Could there be greater differentiation than this?

Head and Holmes support the idea of special fibers for heat sensation and special fibers for cold sensation within the spinal cord. They say: " In the same way, sensibility to heat or to cold

may be lost independently of one another, showing that all the impulses upon which they are based have been sorted out into two functional groups, each of which passes by a separate system in the spinal cord" (*l. c.*, p. 107). They further say that from a lesion in the brain stem below the optic thalamus pain, heat and cold sensibility may be affected together, but any one of them may escape or be affected alone. "Thus von Monakow described loss of sensation to heat and cold without analgesia, and in the case recorded by Mann and later by Kutner and Kramer sensibility was lost to pain and to heat, whilst that to cold was unaffected."

The case to which I have referred which demonstrates that the central fibers for pain in the face are distinct from those for temperature in the descending spinal root of the trigeminal nerve is as follows:

H. G. White, 44 years of age, is in my service (Oct. 1914) at the Philadelphia General Hospital. The disturbance of sensation in the face began about March 28, 1914. He had been in a barbershop and after he left the shop the left side of the face felt numb. He attributed this at first to soap which the barber might have left upon the face, but washing the face did not remove the sensation. The paresthesia of the left side of the face thus began suddenly, and has always been limited to the trigeminal distribution. Its onset was not accompanied by anything resembling an apoplectic stroke. The sensation has been one of stiffness, of burning, of numbness. It has never been felt in the lower part of the face in the distribution of the cervical nerves. He has not been able to stand a fly on the left side of the face, as it "seems to tickle all over," but he can stand a fly on the right side of his face. If a fly crawls over the left side of the face the tickling sensation extends over the left side of the face and into the throat. The sensation is like that of tickling in the sole of the foot. Tickling the left side of the face by light contact with the end of a cloth is very annoying to him. A fly was caught and made to crawl over the left side of the face, and he distorted his face and showed signs of great discomfort. When the fly crawled to the right side of the face he had no discomfort. If he suddenly hears the sound of a whistle he has a choking sensation in his throat. This over-reaction to sensory stimuli from a lesion probably in the medulla oblongata is very interesting and hardly in conformity with the statement made by Head and Holmes that the over-reaction to sensory stimuli can be attributed alone to disturbed activity of the optic thalamus.

The left eye felt as though it were drying up. He had at first

some pain over the left eye only in the distribution of the supra-orbital nerve. Soon after the numbness began he complained of choking sensation in the throat, his throat felt stiff and as though he had some obstruction in it, and this has caused him to cough. The left side of the face feels colder when he goes out of the house.

Analgesia for pinprick and deep pressure is complete (October, 1914) in the distribution of the left trifacial nerve and sharply confined to it. It extends in the scalp to the top of the head, then to the external auditory meatus, then to near the corner of the mouth and chin, and is limited by the midline of the face. The borders are fairly sharply defined. Tactile, heat and cold irritations are promptly recognized in this area and so acute is tactile sensation that he can tell at once when the pin penetrates the skin, but it causes no pain. Warm water is warmer in this area but cold water is equally cold on the two sides of the face. Immediately below the mouth on the left side pain sensation is diminished but not lost, as it is in the remainder of the trigeminal distribution. The mucous membrane of the left side of the mouth shows hypalgesia. The reflex from irritation by ammonia is normal in each nostril. The compass test shows impairment on the left side of the face. The motor branch of the left trigeminal nerve is not affected. The pain sensation of the tongue seems to be normal. The conjunctival reflex is lost on the left side and the corneal reflex is weak; these reflexes on the right side are prompt.

The left side of the soft palate moves much less than does the right side. The voice is hoarse, and the left vocal cord is paretic. He complains of a copper taste in the mouth, but a test shows no objective disturbance of taste.

The left pupil is a little larger than the right. The iridic reflex to light is impaired on each side, the contraction of the pupils in convergence is prompt. The tongue is protruded in the midline. Ataxia of the limbs is not present. The biceps, triceps, and patellar reflexes are about normal. The gait and station are normal. The pain and temperature sensations are normal in all the limbs. The Wassermann test was positive June 13, 1914.

The important features of this case are: The sudden onset of the analgesia in a syphilitic man, confined to the distribution of the left trigeminal nerve, without any other form of disturbance in this distribution; and the paresis of the left soft palate and left vocal cord. There is scarcely any doubt that the lesion is in the left side of the medulla oblongata implicating the descending spinal root of the left trigeminal nerve, and also the glossopharyngeus and vagus nerves. Especially important is the

evidence the case affords that such a lesion may disturb the fibers of pain in the trigeminal nerve without in the least affecting the fibers of temperature, except that warmth may feel a little warmer on the left side of the face. The lesion probably is vascular, hemorrhage or thrombosis, in the distribution of the posterior inferior cerebellar artery. So small a lesion as must be present in this case seems more probably hemorrhage.

The loss of deep pressure pain in this case is interesting. A pencil pressed deeply over the distribution of the left fifth nerve caused no discomfort. Head and Holmes found that a lesion in the brain stem below the optic thalamus " does not usually abolish completely all painful pressure. Thus it would seem that the grosser forms of pain and discomfort may possibly find their way by another path, if the usual one is closed."

Head and Holmes report two cases resembling this one of mine, except that in the first one the pain sensation was lost also in the half of the body opposite the lesion, and in the second the sensory disturbances of the body were not absent as in my case. In their Case 2 a lesion of the bulb caused analgesia of the opposite half of the body and same side of the face and yet the threshold-values of sensibility to heat and cold were equal on the two sides, although warmth seemed hotter and cold less cold over the analgesic parts. The onset in this case was as in my case in that there was no appearance of an apoplectic attack.

In their Case 3, one of occlusion of the posterior inferior cerebellar artery, pinprick sensation in the face on the side of the lesion was lost, but tactile sensation was normal. The threshold for the appreciation of heat and of cold was the same on the two sides, but the patient complained that all temperatures produced a duller sensation in the face on the side of the lesion. Pressure pain was the same on the two sides of the face. Temperature and pain sensations were affected in the body on the side opposite the lesion. Head and Holmes thus report two cases in which pain sensation in the face was lost but temperature sensations were preserved from bulbar lesions. It would seem as though pain fibers were more susceptible than temperature fibers. In their Case 1, one of injury high in the cervical region, pain sensation was lost in the right cheek and in the occipital region. The borders of the analgesic area were not sharply defined but merged gradually into parts of normal sensibility. No difference could

be discovered between the two halves of the face to measured tactile stimuli. Sensibility to heat and cold was not disturbed. The diagram accompanying the report of this case seems to indicate that the analgesia of the right cheek was confined to the distribution of the cervical supply, although this statement is not made by the authors. It seems to have been analgesia without impairment of touch and temperature sensations from a lesion of peripheral neurones. A similar condition has been obtained by Byrnes in some cases after injection of the Gasserian ganglion with alcohol, in that he has found that in recovery of sensation after such injection pain sensation may be the last to return (personal communication).

Head and Holmes do not give the tract for pain and temperature sensations. They say: " This does not necessarily mean that the impulses [for pain, heat and cold] are carried by uninterrupted fibers. It has been suggested by Long, Cajal, Kohnstamm that the nuclei of the formatio reticularis are intercalated in the course of the afferent conduction tracts. Such anatomical relay would not interfere with the above physiological conclusions, as it does not necessarily imply any regrouping of sensory impulses."

6. THE TRACTUS SPINOTHALAMICUS ET SPINOTECTALIS

We have some evidence as to the position of the fibers of pain and temperature; they probably lie in the tractus spinothalamicus et spinotectalis. This tract, according to Edinger and Petrèn, is one of the most important secondary sensory tracts. Obersteiner[7] says it is situated at the ventral part of the nucleus of the posterior colliculus of the corpora quadrigemina. Villiger[8] makes it enter the median fillet in the pons. Marburg[9] represents the tract in a series of drawings as occupying in the middle of the pons the lateral part of the median lemniscus and high in the pons as situated in the region of the lateral lemniscus, external to the superior cerebellar peduncle as the latter descends at the aqueduct of Sylvius.

The tractus spinothalamicus et spinotectalis is situated near

[7] Obersteiner, Anleitung beim Studium des Baues der nervösen Zentralorgane, 5th edition, p. 474.
[8] Villiger, Brain and Spinal Cord, translated by G. A. Piersol.
[9] Marburg, Mikroskopisch-topographischer Atlas des menschlichen Zentralnervensystems.

Gowers' tract throughout its course as high as where the latter
separates from it in the upper part of the pons to enter the cere-
bellum, and it is probably for this reason that disturbances of sen-
sation have been attributed to lesions of Gowers' tract. In oc-
clusion of the posterior inferior cerebellar artery the tractus
spinothalamicus et spinotectalis is usually implicated in the lesion,
and it is probably for this reason that the sensations of pain and
temperature are affected.

According to Ziehen,[10] who gives the best and most recent
description, the fasciculus spinothalamicus et spinotectalis has
been known only about a decennium. Its course in the spinal
cord is known only in a general way. It is assumed that the
tract arises in the cells of the posterior horn and possibly of the
intermediate gray matter. The fibers probably cross in the white
or gray commissure three or four segments above their origin,
and pass into the lateral column. Some fibers probably do not
decussate and these pass to the periphery of the lateral column of
the same side.

The position of the tract in the lateral column can be given
only approximately. It appears to lie immediately interior to
Gowers' tract and is not sharply separated from it. Edinger was
the first to distinguish the tractus spinothalamicus et spinotectalis
and to give it this name. The fibers of this tract to the corpora
quadrigemina and optic thalamus are united probably as far as the
region of the corpora quadrigemina, and here some fibers of this
tract possibly go to the corpus geniculatum mediale, others pass
to the anterior and posterior colliculi of the corpora quadrigemina
partly crossed and partly uncrossed, and the remainder pass to the
optic thalamus. Some fibers of this tract occupy the anterior
column of the spinal cord, but they are less important in man
than in the lower animals.

The physiological significance of this tract is uncertain. The
assumption that either this tract or Gowers' tract, says Ziehen,
represents cutaneous sensation is not sufficiently based on ana-
tomical, physiological or clinical evidence, and on account of the
relatively small size of the former tract and on account of the
course of the latter into the cerebellum such a relation to func-
tion becomes improbable. It is probable that the short connect-

[10] Ziehen, Anatomie des Centralnervensystems, zweite Abteilung, erster
Teil, p. 234. Bardeleben's Handbuch der Anatomie des Menschen.

ing fibers in the interior of the lateral column are concerned in an essential degree with sensation, but this must be determined by further investigation. Ziehen modifies, however, this statement in a very considerable degree. He explains the segmental disturbance of pain and temperature sensations by implication of a long tract, probably the tractus spinothalamicus et spinotectalis and ends by concluding that the question of the conduction of sensation in the spinal cord and medulla oblongata is almost as unsettled to-day as it was ten years ago.

There is no difference of opinion, says Ziehen, as to the ending of the majority of the fibers of Gowers' tract in the cerebellum, and the statements of Soelder and of Quensel as to a termination of some of the fibers in the corpora quadrigeminal region and optic thalamus probably result from a confusion of this tract with the tractus spinothalamicus et spinotectalis.

It is evident that the size of the latter tract has never been accurately determined, and it is not sharply defined from the surrounding fibers. It may be much larger than the statement of Ziehen would indicate.

One or two cases in the literature are important in regard to this subject.

The study by Economo[11] of a case in which a tubercle developed in the left side of the tegmentum of the pons convinced him that the fibers of temperature and pain in the pons must be lateral to the sixth nerve and in or near the lateral part of the median fillet, whereas the fibers of touch and deep sensation must be chiefly in the median part of the median fillet between the sixth nerve and the raphe. His location of fibers of temperature and pain in or near the lateral part of the median fillet conforms to the position of the tractus spinothalamicus et spinotectalis at this level.

In the case of occlusion of the left superior cerebellar artery reported by C. K. Mills[12] sensation in all its forms was fully retained on the entire left half of the body, but was lost to pain, extreme heat and extreme cold on the right half of the body; face, trunk, upper and lower limbs. Tactile discrimination was also greatly impaired, as shown by the compass test. Light touch was preserved. The senses of deep pressure and of position and

[11] Economo, Jahrbücher für Psychiatrie und Neurologie, Vol. xxxii.
[12] Mills, JOURNAL OF NERVOUS AND MENTAL DISEASE, February, 1912.

passive movement were normal on both sides and the man had normal stereognosis in each hand. Deafness in the right ear was complete. Occlusion of the left superior cerebellar artery was found. Among other lesions at the level of the mesencephalic root of the fifth nerve were degeneration of the left lateral lemniscus, of the superior cerebellar peduncle except of a
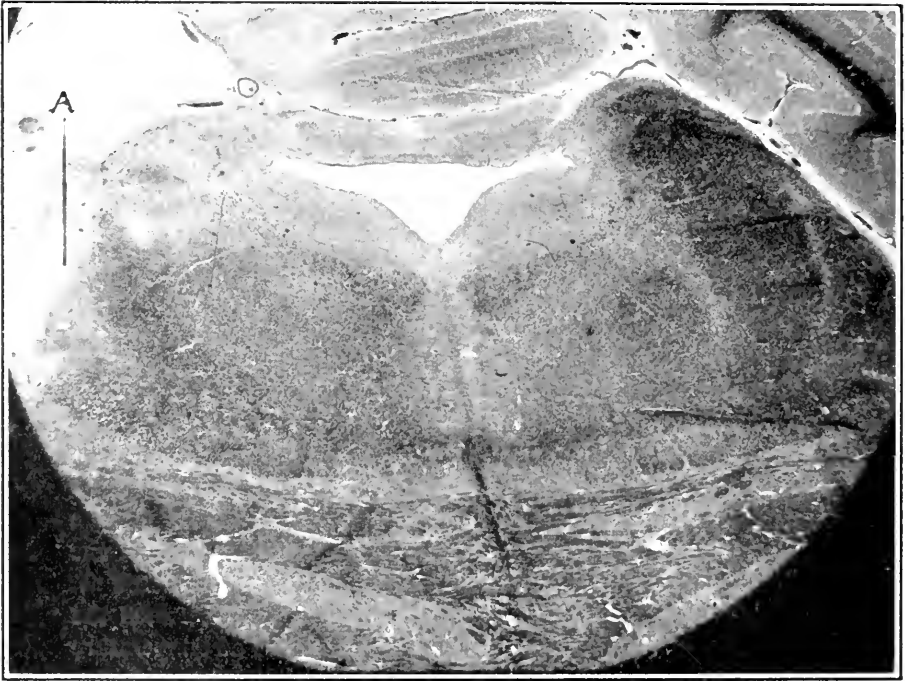
Protograph showing at *A* degeneration of the left lateral lemniscus, of the superior cerebellar peduncle except of a small portion near the median lemniscus, and of a small part of the tegmentum of the pons medial to the superior cerebellar peduncle. I am indebted to Dr. A. J. Smith for the photograph.

small portion near the median lemniscus, and of a small part of the tegmentum of the pons medial to the superior cerebellar peduncle. Here we must search therefore for the fibers conveying the sensations of pain, heat and cold, and this case shows therefore that these fibers are presumably in the tractus spinothalamicus et spinotectalis.

7. The Representation of the Three Divisions of the Trigeminal Nerve in the Spinal Root of this Nerve

In 1901 Dr. C. H. Frazier and I[13] reported the results of experimental work on the sensory root of the fifth nerve. He attempted to cut the sensory root near its entrance into the pons and to save the motor root, and in so doing some of the fibers of the sensory root next to the motor root escaped. The central nervous system from two of the dogs employed I found especially useful for microscopical study. The external portion of the sensory root at its entrance into the pons was much degenerated and the dorsal part of the descending spinal root was greatly degenerated. From this it may be concluded that the fibers of the external portion of the root, which probably represent the second and third divisions, are continued downward in the dorsal portion of the spinal root of the fifth nerve.

Bregman[14] obtained results from experiments on the rabbit very similar to our results obtained in the dog. In his cases, where the descending spinal root of the fifth nerve was fully degenerated, the sensory root at its entrance into the pons was also completely degenerated; but where only the ventral portion of the spinal root was degenerated, only the medial portion of the sensory root at its entrance into the pons was degenerated, and where only the dorsal portion of the spinal root was degenerated, only the external portion of the sensory root at its entrance into the pons was degenerated.

An important paper on the representation of the three divisions of the fifth nerve in the spinal root of this nerve has been written within the past few years by van Valkenburg.

Eisenlohr many years ago concluded from a clinco-pathological case that the three divisions are not in the same areas in the spinal root, and that the third division terminates in the more proximal part of the root.

Wallenberg later in a case of complete anesthesia of the buccal mucous membrane found the proximal part of the spinal root, and especially its dorsal portion, the most degenerated.

Van Valkenburg states that Bregman's observation that in

[13] Spiller and Frazier, University of Pennsylvania Medical Bulletin, December, 1901.
[14] Bregman, Obersteiner's Arbeiten, Vol. i, 1892.
[15] Van Valkenburg, Monatsschrift für Psychiatrie und Neurologie, Vol. xxix (1911).

rabbits the first division terminates more distally in the spinal root than the other two divisions, and that the third division terminates in the frontal part of the root and occupies the dorsal portion in a transverse section, was confirmed by Bochenek.

Van Valkenburg refers to the literature cited above in reporting a case in which there was anesthesia of the first division. The spinal root was degenerated in its most distal portion in the third cervical segment. At the level of the dorsal vagus nucleus a small area in the dorsal portion of the spinal root contained medullated fibers and gradually increased in size in more frontal sections approaching the sensory nucleus. From this case van Valkenburg concluded that the distal portion of the spinal root contain essentially fibers from the first division and these fibers occupy the ventral portion of the root in transverse sections in more proximal regions. The second and third divisions occupy the dorsal portion of the spinal root and terminate in the more proximal parts of this root and in the sensory nucleus in the pons. This view however has been disputed by some investigators.

I have examined two cases of syringomyelia with great disturbance of pain and temperature sensations but not of tactile sensation in the face. No other cranial nerve than the trigeminus was affected. It is presumable that a lesion in the medulla oblongata implicated the spinal root of the fifth nerve. The greatest impairment of sensation was in the distribution of the first division of the nerve, the forehead; the least impairment was in the distribution of the third division, the chin. In one of the two cases this arrangement was very striking. These cases would seem to show that the first division of the fifth nerve descends lower than the other two branches, and that the third division descends the least in the spinal root. Opposed to this view is that in which the representation of the spinal root in the face is in gradually diminishing circles as the anesthesia progresses.

The evidence of separate representation of the three divisions of the fifth nerve in the spinal root is of great value, and it seems not only that each division is represented in large measure separately, but that in this separate representation of each division in the descending spinal root the sensations of temperature depend on different fibers than do those of pain.

8. The Representation of Pressure Sensation of the Face in the Facial Nerve

Head has shown that deep sensation of the body has a different peripheral nerve distribution from that of superficial sensation. It has seemed to me probable that the deep sensation of the face depends in part at least on the integrity of the seventh nerve. I[16] reported briefly in 1906 two cases in which the pressure sensation was preserved after removal of the Gasserian ganglion, and I discussed this subject in a paper published in 1908 with a report of two cases. These two cases were referred to in a paper by Ivy and Johnson.[17]

In some cases of removal of the Gasserian ganglion for tic douloureux all sensations, including that of pressure, is lost, at least for a period, following the operation, but in the two cases of removal of the Gasserian ganglion for tumor which I observed, preservation of pressure sensation persisted with loss of other forms of sensation in the distribution of the fifth nerve. In some if not in all of these tumor cases in which the ganglion is implicated removal of the ganglion or of a large part of it does not seem to be followed by complete loss of pressure sensation in the distribution of the fifth nerve. This preservation of pressure sensation was very remarkable in my two cases, in one of which a large part of the ganglion had been removed, and was observed also in a case of Dercum, Keen and Spiller. In the case of Hofmeister and Meyer, after the operation light touch usually was not recognized, but pinprick was felt somewhat better without distinction of head and point; this may have been caused by preservation of pressure sensation.

In my first case before any operation tactile sensation was completely lost in the entire distribution of the right fifth nerve, provided little or no pressure was produced. Sensation of pain was lost in the same distribution. At the necropsy nothing could be seen of the Gasserian ganglion, as its position was occupied by a tumor. The right fifth nerve was enveloped in a tumor at its entrance into the pons, and the tumor covered the pons at the entrance of the fifth nerve into the pons, so that the fibers of this nerve became a part of the tumor immediately beneath the

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[16] Spiller, Journal of Nervous and Mental Disease, 1906, p. 736, and American Journal of the Medical Sciences, November, 1908.

[17] Ivy and Johnson, University of Pennsylvania Medical Bulletin, May, 1907.

pons. The nerve was completely degenerated at its entrance, as shown by the Weigert hematoxylin method.

In my second case tumor was found about the right Gasserian ganglion, and a portion of the tumor and ganglion were removed. After the operation touch was not felt in the distribution of the three branches of the fifth nerve unless it were made with slight pressure, when it was recognized. The right conjunctiva was anesthetic. At the necropsy a tumor was found occupying the position of the Gasserian ganglion and no distinct ganglion tissue could be found by the naked eye. The sensory root of the right nerve was intensely degenerated, as shown by the Weigert method, and nerve cells and nerve fibers of the ganglion found embedded in the tumor were much degenerated.

It is true that in some cases excision of the Gasserian ganglion causes complete loss of all forms of sensation, but this fact does not make the transmission of certain forms of sensation through the facial nerve impossible. It is possible that the deep sensation of the facial nerve may be temporarily interfered with by operation on the trigeminal nerve. Twisting out peripheral branches of the latter causes much swelling of the face, and probably thereby some impairment of the function of the seventh nerve. Excision of the Gasserian ganglion causes swelling of the axis cylinders and medullary sheaths of the peripheral branches of the trigeminal nerve, and if these are intimately associated with branches of the facial nerve this swelling may also interfere temporarily with the function of the latter. Destruction of the sensory root of the trigeminal nerve by a tumor affords better opportunity for testing the sensation of the face, than does destruction of some part of this nerve by operation, at least in the period immediately following operation. There is great need of further observation regarding the preservation of pressure sensation in relation to lesions of the trigeminal nerve before we can arrive at any positive conclusions.

In a case of mine of loss of tactile sensation in the distribution of the left fifth nerve, referred to in this paper, deep pressure sensation was preserved below the left eye where tactile sensation was lost. In a case reported by van Valkenburg, also referred to in this paper, superficial sensation was lost in the first division of the fifth nerve with degeneration of the descending spinal root, but rubbing and pressure were recognized in this area.

In their study of the pressure sensation of the face Maloney and Kennedy[18] came to the conclusion that the fifth nerve must be regarded as the essential path for those impulses from the face which affect consciousness as sensations of pressure-touch; that after removal of the Gasserian ganglion pressure-pain may persist unimpaired in the face and tongue, but never in the eye; that the seventh nerve contains no pressure sense fibers distal to the Fallopian canal, and that the sympathetic fibers subserve a general crude sensibility to pressure-pain.

9. POSITION OF SENSORY FIBERS WITHIN THE INNER CAPSULE

While we have satisfactory evidence that different forms of sensation are represented separately in the central nervous system as high as the basal ganglia, we have little to lead to a positive conclusion that the same is true of sensory representation at higher levels. It is presumable that the same rule holds good.

From two cases that I have studied, one with Dr. Dercum[19] and one with Dr. Camp,[20] I believe that sensation, not including the special senses, is represented at the posterior part of the posterior limb of the internal capsule, as Charcot held, and that sensory fibers are not intimately intermingled with motor fibers in the posterior limb of the internal capsule. The separate localization of motion and sensation in the cerebral cortex is in support of this view, for it is impossible to understand why the sensory and motor fibers should be distinct as high as the subthalamic region, should mingle in the internal capsule, and separate again in the cerebral cortex. I can obtain no evidence however that the different forms of sensation are separately represented in the posterior part of the posterior limb of the internal capsule, but I should not be surprised if such evidence were obtainable later.

Wenderowic,[21] from the recent study of a brain with the Marchi method, concludes that the sensory fibers do not occupy a separate region in the internal capsule but are spread over a great part of the capsule, and partly are mingled with the motor fibers, although the latter occupy a more clearly defined area and

[18] Maloney and Kennedy, Brain, September, 1911, p. 1.
[19] Dercum and Spiller, American Journal of the Medical Sciences, 1902.
[20] Spiller and Camp, JOURNAL OF NERVOUS AND MENTAL DISEASE, 1912.
[21] Wenderowic, Archiv für Psychiatrie, Vol. 55, No. 2, p. 486.

not the entire area occupied by the sensory fibers. Sensory fibers are found in both central convolutions in nearly equal number, but the motor area is limited to the anterior central convolution. The motor fibers thus both in the cortex and in the internal capsule lie within the sensory fibers.

There can now be little doubt that the parietal lobe is the great cortical sensory area; it is possible that sensation is represented in its different qualities in different parts of this lobe, and it is probable that different segments of the body are separately represented as regards sensation in the parietal lobe, the sensory area being near the corresponding motor area, as shown especially by the experimental work of van Valkenburg.

THE FOUNDERS AND WORK OF THE PHILADELPHIA NEUROLOGICAL SOCIETY

By T. H. Weisenburg, M.D.

OF PHILADELPHIA, PA.

PROFESSOR OF NEUROPATHOLOGY AND CLINICAL NEUROLOGY, MEDICO-CHIRURGICAL
COLLEGE; NEUROLOGIST TO THE PHILADELPHIA GENERAL HOSPITAL

It is fitting on an occasion like this which celebrates the thirtieth anniversary of our society, that a record should be made of those who thirty years ago came together to start an organization which has continued as one of the leading factors in the development of neurology in this country. The initial meeting to take into consideration the organization of a neurological society was held in the office of Dr. Charles K. Mills in November, 1883, and was brought together through a call issued by him to a few of those interested in neurology in Philadelphia. Those present at this meeting were Drs. Sinkler, Eskridge, Dercum and Mills.

On December 15, 1883, a meeting was held in the hall of the College of Physicians in response to a call to take into formal consideration the establishment of a Philadelphia Neurological Society. It may be of historical interest to give here the names of the nineteen who were present at this meeting: Drs. Granville L. Angney, Alice Avery, Alice Bennett, Lewis Brinton, A. P. Brubacker, Robert H. Chase, Francis X. Dercum, J. T. Eskridge, Robert A. Given, S. Preston Jones, I. N. Kerlin, James Hendrie Lloyd, Charles K. Mills, George Moorehouse, N. A. Randolph, Edward F. Reichart, D. D. Richardson and Wharton Sinkler. Of the nineteen at least nine (Drs. Sinkler, Eskridge, Moorehouse, Kerlin, Richardson, Jones, Randolph, Given and Angney) have died.

A word or two might be said of some of these. Dr. George Moorehouse is chiefly known to neurologists by his association with Dr. S. Weir Mitchell and Dr. W. W. Keen in their work

on diseases and injuries of the nerves done chiefly at Turner's
Lane Hospital, Philadelphia, during the Civil War.   Dr. S.
Preston Jones who was for many years the first assistant physi-
cian at the Pennsylvania Hospital for the Insane, was a well-
known alienist and medical jurist.   Dr. I. N. Kerlin was the able
and energetic superintendent of the Pennsylvania Training
School for feeble-minded children at Elwyn, Pa., which institu-
tion was brought by him to a high state of efficiency.   He was
a frequent contributor to psychiatry, especially in its relations to
the mentally defective.

   Dr. Wharton Sinkler left behind him a name which is dear to
all members of this society and one which is respected wherever
American neurology is known.   He later became the president
of the society and of the American Neurological Association.
He always took an active interest in our proceedings, as is evi-
denced by even a casual examination of the minutes of the
society.   For many years he was one of the most active members
of the staff of the Orthopedic Hospital and Infirmary for
Nervous Diseases.   He was also one of the founders of the
Epileptic Hospital and Colony Farm at Oakburn, Chester County,
Pa., the development of which owes more to him than to anyone
else.   In 1903 he was president of the National Association for
the Study of Epilepsy and the Care and Treatment of Epileptics.
He was the author of important contributions on the subjects of
infantile paralysis (anterior poliomyelitis), chorea, epilepsy, and
neurasthenia and wrote one of the earliest papers on syringo-
myelia recorded in this country.   The phenomenon usually
spoken of as the great toe reflex was first described by him in the
Medical News for December 1, 1888.

   Although he was personally known to only a few of the older
members, it is well worth while to recall Dr. J. T. Eskridge, who
was the first temporary secretary of the society.   Dr. Eskridge
was a man of great ambition and powers of work.   In a few
years he made for himself a reputation as a neurologist in Phila-
delphia, contributing numerous papers to the neurological, patho-
logical and other societies.   Owing to his poor health he went to
Colorado, where he remained until the time of his death.
Although hampered by ill health his courage never left him and
he soon made himself the most prominent man in neurology and

ophthalmology in the Rocky Mountain west, becoming well known as a medical teacher, writer, neurological consultant and medico-legal expert.

The first formal meeting of the Society was held January 28, 1884, in the Hall of the College of Physicians, 13th and Locust Streets, at which time a plan of organization was presented by a committee and adopted by the society. At this meeting Dr. I. N. Kerlin acted as temporary chairman and Dr. Eskridge as temporary secretary.

The first officers of the association in accordance with the recommendations of the organizing committee were Dr. S. Weir Mitchell, president, Dr. Mills and Dr. Kerlin vice-presidents, Dr. Lloyd, secretary, Dr. Brinton, recorder, and Drs. Eskridge, Sinkler, Brubacker and Jones, councillors. The first meeting of the society for scientific work was held February 25th, 1884.

Dr. S. Weir Mitchell accepted the first presidency on the urgent invitation of all those interested in the formation of the society and continued as president for six years. He was usually present at the meetings and contributed valuable material to the society's proceedings. He was looked upon by every member as a guide, councillor and friend and his personal influence did much to promote the society's welfare. Since the death of Dr. Mitchell, January 4, 1914, many memorials of him have been held, his character has been ably delineated by those who knew him best, and the story of his work in science, medicine and general literature has been fully told. The readers are referred to these biographical sketches and analyses for details of the life and character of this great Philadelphian.

From time to time in the proceedings of the society Dr. Mitchell directed attention to those neurological matters which had for him especial interest and which he made particularly his own by numerous contributions to medical literature,—injuries and diseases of the peripheral nerves and physiological conclusions drawn from their study, neurophysiological investigations of various kinds especially those relating to the cerebellum, and the therapeutics of the nervous system. Not infrequently in the society he urged his younger colleagues in their zest for physiological and pathological investigation not to lose sight of the real work of the doctor, which was to relieve suffering and cure

disease. The attention of the society was often directed by him
to new clinical types and subjects presenting such features of
dramatic interest as allowed both his literary and scientific tend-
encies full play.[1]

Of those who were present at the organization of the Phila-
delphia Neurological Society three are with us this evening and
have places on the scientific program of this celebration. The
society has also seen fit to elect them as its chief officers for this
anniversary year. They are Drs. Mills, Dercum and Lloyd.
From the time of the inception of the society to the present they
have been active spirits in promoting its welfare as they have
that of American neurology in general. The evidence of this is
ample in the society's minutes and in current medical literature.

It is not always best to leave the recounting of the work and
merits of those who deserve such recognition until they have
passed from among us. It will assuredly not be out of place on
the thirtieth anniversary of our society to recall to its members
and its friends the neurological work of those of its number
who have continued with it during its entire existence and have
contributed largely to the advance of neurology.

A study of the bibliography of Dr. Mills shows that in the
period between 1875 and 1914 inclusive he made 301 contribu-
tions to the literature of the period, all of these with the excep-
tion of about a score neurological. Among these were three
text-books or treatises, parts of many " systems " concerned with

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[1] Among the biographical memoranda relating to Dr. Mitchell are the
following :—

At a special meeting of the College of Physicians of Philadelphia,
held on the day of Dr. Mitchell's funeral, January 6, 1914, a minute was
passed and addresses were made by the president of the college, Dr. James
C. Wilson, by Dr. James Tyson, Dr. W. W. Keen and Dr. George E. de
Schweinitz. On March 31, 1914, a joint memorial meeting was held at the
college by the College of Physicians, the American Philosophical Society,
the University of Pennsylvania, the Library Company of Philadelphia,
the Jefferson Medical College and the Academy of Natural Sciences, at
which addresses were made by the president of the college, by Talcott
Williams, Esq., of Columbia University, by Dr. William H. Welch, of
Johns Hopkins University, and by Mr. Owen Wister. The above addresses
have all appeared in a memorial volume which can be consulted at the
principal libraries of Philadelphia and the country at large. Other bio-
graphical sketches of Dr. Mitchell have been published, among these one
by Dr. Charles K. Mills in the JOURNAL OF NERVOUS AND MENTAL DISEASE,
Vol. 41, No. 2, 1914; another by Dr. James J. Putnam in the Boston Med-
ical and Surgical Journal, Vol. clxx, No. 22, 1914, and others by Dr.
Edward Jackson in Colorado Medicine, November, 1914, by Dr. Beverley
R. Tucker, published by Richard G. Badger, Boston, 1914.

nervous diseases, general medicine, therapeutics, diseases of children and medical jurisprudence and numerous monographs and special articles. A study of his writings shows that they would fall more or less into subjects included under at least five groups, —(1) cerebral, spinal and peripheral localization, (2) cerebral schema and mechanisms, (3) new symptoms, syndromes or types of nervous disease, (4) miscellaneous contributions, clinical, clinico-pathological and medico-legal, and (5) medical biography and history.

In no field of neurology has the work of Dr. Mills been carried further than in that of localization, especially cerebral localization, although a consultation of his writings shows that he has given much attention to the subject in its spinal, plexic and peripheral aspects. So numerous have been the contributions of our president to the subject of cerebral localization that reference can be made in the time at my disposal to only a few.

As early as 1879 he began to record instances of focal disease of the brain with localization phenomena, reporting then a case of tumor with comments indicating the psychic functions of the frontal lobe and callosum.

Dr. Mills early indicated the importance of cerebral fissures, at least certain of the main fissures of the cerebrum, as probable boundaries of functional areas. He recognized more than twenty-five years ago the fact that the motor region was largely in advance of the central fissure, a position now almost universally held especially since the work of Grünbaum and Sherrington on the gorilla. In conjunction with surgeons like Dr. Keen, Dr. Frazier, Dr. Hearn and others he has added to our knowledge of cortical localization as the result of faradic applications to the human cerebrum, such applications having been made with the view of assisting in the more exact circumscription of fields of operation. He demonstrated, among other things, on the human subject the centers for movements of the head and of the head and eyes, for elements in the movements of Darwin's muscles of grief, the widespread diffusion of the representation of movements of the muscles of the jaw and the differences in stimulation required to produce localized movements by electrical excitation, caudad and cephalad of the central fissure. With the writer and Dr. Stewart Rodman, he was I believe the first to

indicate the representation of synergic movements in the cerebellum by stimulation of the human cerebellar cortex.

Dr. Mills postulated the existence of an orientation center (higher cerebral vestibular center) in the temporal lobe and to him is largely due the development of the symptomatology of the parietal lobe, a fact referred to by Bruns of Hanover at the meeting of the seventeenth international congress in London (1913). His work on the physiology of taste and uncinate symptomatology is well known and received recognition from Dr. J. Hughlings Jackson, the pioneer in this field.

The record of one of his cases,—that on the localization of the center for word-hearing through the study of a case with lesions of the superior temporal regions of both hemispheres,—has become classical in the history of the subject of aphasia, but it is not necessary for me to tell the members of this society of his numerous additions to our knowledge of such subjects as aphasia and the cerebral zone of speech, tumors of the brain and of the spinal cord, and cerebellar symptomatology and localization.

Among the most important contributions to cerebral mechanisms and cerebral physiological topography are those which are contained in his expositions of various new schema of the zones and centers of the human cerebrum, and his discussions of the separate localization of the motor and sensory functions in the cerebral cortex, of the subdivisions of the areas of representation of cutaneous and muscular sensibility and of stereognosis, of the subdivisions of the posterior association area of Flechsig which he has designated as the concrete memory field, of emotional expression and its cerebral representation and of the cerebral tonectic apparatus and some of the clinical problems of cerebral tone.

Dr. Mills has contributed his share to the list of new symptoms, symptom complexes and clinical types of nervous disease. To Wilbrand the credit for first calling attention to macular hemianopsia is usually given, but as Dr. W. C. Posey points out, this is due to Dr. Mills (The Ophthalmic Record, May, 1908).

What is known as Korsakoff's disease, the combination of alcoholic polyneuritis with special psychic phenomena indicating cerebral involvement, was recognized by Dr. Mills in 1886, some time before the publication of Korsakoff's first paper.

To him we owe the clinical type known as unilateral ascending paralysis due to degeneration of the pyramidal tract. On this subject he published not only his original case, but other papers dealing with different types of both unilateral ascending and unilateral descending paralysis. Still fresh in the memories of our members is his report of the first case of occlusion of the superior cerebellar artery, presented both to this society and to the American Neurological Association (1912). In not a few instances he was among the first to call attention in this country to types of organic nervous disease which had been observed abroad and in some of these cases without knowledge of their previous record. This was true with regard to disseminated sclerosis, he having published a paper embodying the report of a case with necropsy and serial microscopic examination as early as 1879.

A fact brought out in the bibliography of Dr. Mills and by a knowledge obtained from a study of his writings is the wide range of practical subjects which his contributions cover—neurological surgery or surgical neurology, cerebral morphology, vasomotor and trophic affections, hydrophobia, tuberculous meningitis, multiple neuritis, poliomyelitis, myotonia and athetoid spasm, surface thermometry, electro-therapeutics, problems in electrical potential, hypnotism, hysteria, neurasthenia, psycho-therapeutics, mental overwork, massage and Swedish movements, systematized exercises as a therapeutic measure, occupation neuroses, the localization of brain tumors by roentgen-ray exploration, aphasia and its treatment by training, disorders of pantomime, the symptomatology of lenticular lesions, intradural root anastomosis, insanity in children and adults, criminal lunacy and the medicolegal aspects of nervous diseases and of insanity.

The contributions of Dr. Mills to medical biography and history have not been without their interest. Among biographical sketches written by him are one on Benjamin Rush and American psychiatry, one on Isaac Ray, the great alienist and medical jurist, and his recent tribute to his friend of many years, Dr. S. Weir Mitchell. His historical papers include the history of medical jurisprudence in Philadelphia, the history of neurology in Philadelphia from 1874 to 1904, and historical sketches of the Philadelphia Hospital for the Insane and the Philadelphia Alms-

house and Hospital from 1854. One of his favorite recreations is the study of the local history of one of the most interesting sections of Philadelphia which has for its center the place of his birth, the Falls of Schuylkill. The associations of this old village with the history of the University of Pennsylvania and the military history of the neighborhood from colonial times to the end of the Civil War are among his additions to local history. He is a member both of the Pennsylvania Historical Society and of the City History Society of Philadelphia.

Dr. Mills began his teaching at the University of Pennsylvania as early as 1877, his first connection with the University as chief of the clinic for nervous diseases dating back about three years before this time. Subsequently he filled various positions, psychiatric or neurological, until on the retirement of Dr. Wood he was elected to his present position in 1901. In 1892 he was made Professor of Mental Diseases and of Medical Jurisprudence, the latter under what was known as the " George B. Wood Foundation." While he held his professorship of jurisprudence he was for several years dean of the auxiliary faculty of medicine of the University of Pennsylvania. It is interesting in connection with the chairs of mental disease and medical jurisprudence to note in the first place that with the exception of a few cases demonstrated at the Philadelphia Hospital by Dr. D. D. Richardson for Dr. Isaac Ray to illustrate his lectures on mental diseases at the Jefferson Medical School, Dr. Mills' clinical lectures on insanity were the first of the kind ever given in this city and probably in this country and in his chair of mental diseases he gave the first formally organized instruction in psychiatry in the university after the time of Benjamin Rush. He inaugurated the clinical teaching of the medical jurisprudence of insanity and nervous diseases by illustrating his university lectures by the demonstration of cases of medico-legal interest at the Philadelphia Hospital.

It is not as well known as it should be in how many instances Dr. Mills has been the initiator or founder of medical movements of importance both neurological and general. Reference has already been made to the part played by him with others in the foundation and development of this society. His greatest work, not only for neurology, but also for humanity, according not only

to my own estimation, but to that of many others, was the
founding of the nervous wards of the Philadelphia General
Hospital in 1877, to which he has given unflagging attention and
interest from their organization to the present time. His last
work to broaden the field of American neurology was the initia-
tion of the movement which has just been consummated to estab-
lish a Philadelphia post-graduate school of neurology largely on
the basis of the opportunities afforded by these wards which have
grown to such proportions that they are now recognized as one
of the greatest neurological services in the world.

He was one of the founders of the Philadelphia Polyclinic.
He took a prominent part in the movement which resulted in the
organization of the Congress of American Physicians and Sur-
geons in 1888. At its first meeting in Washington in September,
1888, he was one of the four to whom the main addresses at the
general meeting were assigned. His address, the subject of
which was " Cerebral Localization in its Practical Relations," was
published in its entirety, not only in the proceedings of the Con-
gress but also in *Brain*.

Dr. Francis X. Dercum, who with Dr. Mills and Dr. Lloyd
had the honor of being one of the founders of this society, from
the beginning of his professional career was interested in neurol-
ogy. He has written altogether 132 papers, 8 parts of text-books
or systems, one text-book on nervous diseases and one on insan-
ity. At first he was on the neurological staff of the University
of Pennsylvania, becoming chief of the out-patient department
of the University Hospital. He was called to fill the chair of
nervous and mental diseases in the Jefferson Medical College in
1892, this position being created for him. The manner in which
he has conducted this department has made it one of the most
important and distinguished of this school. For twenty-five
years he was one of the visiting neurologists to the Philadelphia
General Hospital, to the reputation of which he has largely con-
tributed. Much of his valuable work has been based on his
neurological service in this hospital. He has been connected
with many institutions in Philadelphia and its vicinity, having
been at various times on the staff of the Pennsylvania Institution
for Feeble-Minded Children at Elwyn, the State Hospital for
the Insane at Norristown, Pa., the Orthopedic Hospital and In-
firmary for Nervous Diseases of Philadelphia, St. Agnes Hos-

pital, the Jewish Hospital, the Hospital for the Chronic Insane
at Wernersville, etc. He was the third president of this society
and has been president of the American Neurological Association
and the Philadelphia Psychiatric Society. He is the present
chairman of the Section of Nervous and Mental Diseases of the
American Medical Association. He is one of the few American
corresponding members of the Neurological Society of Paris
and the Neurological and Psychiatric Societies of Vienna and a
member of the Royal Medical Society of Budapest.

An analysis of Dr. Dercum's bibliography shows that his
papers divide themselves into certain groups. Early in his career
he became much interested in anatomical and morphological re-
search. His first paper in 1878 on the " Sensory Organs, Sug-
gestions with a View to Generalization," embraced localizations
in regard to morphology which were later formulated by Haeckel.

In a paper on the " Morphology of the Semi-circular Canals "
(1879), Dr. Dercum pointed out that these structures were in all
probability evolved from the lateral line system of a remote
aquatic ancestor by the involution of dermal structures, a view
which was subsequently adopted by other biologists. In an in-
vestigation on the lateral line system of fishes, he pointed out that
the nerve hills in this apparatus had a structure identical with
that of the macula acustica and that the lateral line system was
a sensory apparatus like that of the semi-circular canals and was
adapted to receiving coarse wave impressions, the waves in this
instance having a lower rate than that of sound vibrations.

Later came papers by Dr. Dercum on the " Morphology of the
Brain in Epileptics " and " Studies in Criminal and Racial Mor-
phology."

Especially interesting were some of his findings as regards
the transition convolutions between the occipital and parietal
lobes in some cases of arrested development and in the brain of a
murderer. Some of the anatomical conditions were as he pointed
out comparable to those met with in the higher apes.

In 1884 Dr. Dercum described in connection with Dr. A. J.
Parker[2] convulsive seizures which could be induced by artificial
means, demonstrations of convulsions so induced being subse-
quently made at a meeting of the Philadelphia Neurological
Society at the request of the president, Dr. S. Weir Mitchell.

[2] The contributions of Dr. Parker to cerebral morphology have been
described at length in the presidential address this evening.

A full account of the character of these seizures and of the method of their production was published in the JOURNAL OF NERVOUS AND MENTAL DISEASE in 1884. About this time (1884) Edward Muybridge was conducting his epochmaking investigations by his method of successive instantaneous photographs of animals in motion. Mr. Muybridge seized the opportunity of making photographs of a subject in these artificially induced convulsions. These pictures have since become historic, this being the first time in which photographs were made of a person in convulsions.

At about the same time Dr. Dercum took part with Mr. Muybridge in the extensive investigation conducted at the University of Pennsylvania of animal locomotion by means of instantaneous photography. These included the study of normal and pathological human gaits and various manifestations of disease. The results were published by the University in a book on "Animal Locomotion," in 1888. This volume included a chapter by Dr. Harrison Allen on the locomotion of animals as illustrated by instantaneous photography and another by Dr. Dercum on locomotion in man, normal and pathological. The Muybridge studies are interesting not only because of the results achieved at the time, but because they were the forerunners of the modern moving pictures.

Dr. Dercum has always had a marked interest in the functional side of neurology. This is evidenced by the large number of papers he has published on functional disorders, especially on hysteria and neurasthenia, and in the last few years in psychoanalysis; although it is not to be understood that Dr. Dercum by any means favors Freudian psychology, he being, in fact, one of its most determined opponents. In 1903 he published a treatise on "Rest, Mental Therapeutics and Suggestion," this being one of the first to contain in the English language a comprehensive consideration of psychotherapy.

Dr. Dercum has written on practically every phase of mental disease. It is interesting to note in connection with the subject of his address this evening on " Nervous and Mental Diseases and the Newer Pathology," that as early as 1885 he advocated a theory of the toxic origin of mental disease. In 1901 he advanced a clinical classification of insanity which has since in large measure been adopted. In 1902 he published a paper on " Hypochondria "

in which he delimited this neurosis and pointed out its differentiation from the other great neuroses,—neurasthenia and hysteria. Dementia præcox has received his attention in various contributions of unusual value. During the present year (1914) he has given the profession an excellent text-book on mental disease which embodies the results of his experience in practice, in teaching, and in the study of current medical literature.

Allied with his interest in mental diseases has been his work on different forms of dystrophy, especially in regard to the ductless glands. One of his earliest papers concerned itself with myxedema. Few if any have contributed more of value to our knowledge of scleroderma, acromegaly, cretinism, primary neurotic atrophy and the different types of obesity.

In 1888 he described under the title of " A Subcutaneous Connective Tissue Dystrophy " a new symptom group to which he subsequently in 1892 gave the name of *Adiposis Dolorosa*, publishing the first case with necropsy in 1900. Many articles on the same subject in which full credit has been given to the original observation have appeared during the last twenty years.

To clinical neurology, to cerebral and spinal localization, and to the surgery of the nervous system Dr. Dercum's contributions have been numerous and important.

In 1889 he reported with Dr. J. William White two cases of spinal surgery, in one of which complete recovery from paraplegia ensued after operation for a localized serous meningitis, this being one of the earliest of the successfully reported cases and in 1894 he reported with Dr. W. W. Keen two cases of ingravescent cerebral hemorrhage treated by the rare operation for this affection,—ligation of the common carotid artery.

The early development of optic neuritis in cerebellar lesions; lead poisoning with special chemical investigation; Wernicke's pupillary reaction in a case of pulvinar disease; colloid implication of the blood vessels of the spinal cord; metastasis of the thyroid gland to the spinal column—these are a few of the numerous neurological papers by Dr. Dercum worthy of special mention.

As early as 1886 Dr. Dercum wrote a paper entitled " Facts and Deductions Bearing Upon the Action of the Nervous System," this containing many views recently advocated by Crile of Cleveland. In 1896 he advanced a theory of neuronic action,

according to which the terminations of the collaterals, dendrites and neuroaxons of nerve cells had the property under stimuli of retracting or extending, thus separating or uniting with other nerve cells.

In recent years, Dr. Dercum in his writings on aphasia has ably espoused the views of Marie, in this connection reporting many cases with necropsy.

As a medical jurist Dr. Dercum's reputation is more than local, his contributions to legal medicine being widely known and quoted.

James Hendrie Lloyd, from 1881 up to the present has written 100 papers, 12 special articles or treatises in different systems or text-books, and one book on the medical jurisprudence of insanity.

Dr. Lloyd has by no means confined his energies to neurology, he being one of the most scholarly physicians in Philadelphia. For several years he was the able editor of the Philadelphia Medical Journal, now incorporated with the New York Medical Journal.

Dr. Lloyd has been on the neurological staff of the Philadelphia General Hospital, with the exception of two brief intervals, since 1887. He has long been a member of the medical board of the Training School for the Feeble-Minded at Elwyn, Pa., and of the Hospital for the Chronic Insane at Wernersville, Pa. He founded the neurological service at the Methodist Episcopal Hospital of Philadelphia. He was the fifth president of the Philadelphia Neurological Society and was president of the American Neurological Association in 1889.

In cerebral localization the work of Dr. Lloyd has been conspicuous. In 1888 he published a paper with Dr. J. B. Deaver on trephining in focal epilepsy, one of the earliest articles based upon physiological cortical experimentation. The cortex was exposed and certain motor centers located by faradic stimulation. In 1888 another paper with Dr. Deaver was based upon the application of the principles of localization to spinal surgery.

His bibliography shows that Dr. Lloyd has contributed largely to the symptomatology of brain and spinal cord tumors. In 1885 he published with Dr. Mills monographic articles on tumors of the brain and of the spinal cord in Pepper's System of Medicine, this being one of the earliest contributions on the modern aspects of this subject.

Among other notable neurological contributions of Dr. Lloyd are those on diseases of occupation and diseases of cerebrospinal and sympathetic nerves, published in the Twentieth Century Practice of Medicine in 1895 and 1897 respectively; porencephalon; cerebral decompression; the X-ray localization of brain tumors; the surgery of the brain in pituitary disease and the changes in the spinal cord due to pernicious anemia.

In the discussion of the subject of aphasia Dr. Lloyd has taken the ground that both sensory and motor defects are found in so-called motor aphasia and in general he has antagonized the views of the extreme localizationists.

A case of syringomyelia with complete microscopic study was early recorded by Dr. Lloyd, and among his most valuable contributions are those on the traumatic affections of the cervical region of the spinal cord simulating this disease. With Dr. Ludlum, in a paper on primary lateral sclerosis, he advocated the view that this disease is a clinical entity and that it is frequently due to syphilis.

The medical jurisprudence of both insanity and of nervous diseases has been enriched by the pen of Dr. Lloyd.. His treatise on " Insanity; Its Various Forms and Its Medico-Legal Aspects " in Wharton and Stille's Medical jurisprudence, Vol. 31, 5th edition, is the most valuable work on the subject since the treatise of Ray.

Among the many noteworthy papers Dr. Lloyd has published on mental diseases is that on the metaphysical conception of insanity as shown in the terminology of psychiatry (1904). Others by him are those on faith cures (1886), hysteria (1883), moral insanity (1886) and the Œdipus complex in Hamlet (1911). Psychoanalysis as advocated by him is not of the Freudian school.

It would be unjust in reviewing the work of Dr. Lloyd not to refer to the unusual value of his contributions from the standpoint of scholarship and literary merit as well as from their scientific aspects. The charm of his style and his enthusiasm in presentation have never failed to awaken and fix the attention of the society.

The Philadelphia Neurological Society was the second of local neurological societies in this country. The New York Neurological Society was founded in 1872. In Boston in 1880 a society was founded which was at first known as the Boston

Medico-Psychological Society. This was not in name or scope a strictly neurological organization. It become known later as the Society of Psychiatry and Neurology under which designation it still flourishes. The Chicago Neurological Society was founded in 1894, and other societies in St. Louis, Baltimore and elsewhere were organized at later periods. The American Neurological Association was founded in 1875.

At the twentieth anniversary of the founding of the Society, held in January of 1904, Dr. Mills read an address on Neurology in Philadelphia from 1874 to 1904. In this paper he gave a résumé of the work of the society during the first twenty years of its existence which I might be permitted to quote in this connection.

" During the twenty years of the existence of the Philadelphia Neurological Society 616 contributions to its proceedings have been made. The presentation of a list of these contributions would probably serve no useful purpose except to show the interest and industry which have characterized the society during its life of two decades. A tabular analysis of these contributions may be of some value as giving a general idea of the work done. A list of the contributions was prepared under my direction by Dr. J. W. McConnell and Dr. T. H. Weisenburg. I have found it somewhat difficult to group these contributions under a few heads, but with the list before me and with a personal knowledge of the work of the society, from whose meetings I have been absent less than a dozen times since its foundation, I have arranged these contributions to the proceedings under the four heads of (1) formal papers; (2) minor scientific contributions; (3) cases reported and patients presented; and (4) pathological specimens and special pathological reports. Under formal parts have been classed all contributions important in their quality or length or in both; under minor scientific contributions have been included notes on special matters often of much value, such as those referring to new instruments or methods of investigation, new drugs or therapeutic measures, and new observations in symptomatology; under cases reported and patients presented have been grouped not only patients actually presented to the society, but also cases and sets of cases reported from time to time without presentation of the patients; and under pathological specimens and special pathological reports have, of course, been

classed the numerous specimens with and without special reports
so frequently exhibited at the meetings of the Society. Thus
classified, the 616 contributions to the Society's proceedings dur-
ing the twenty years have been as follows: Formal papers, 244;
minor scientific contributions, 39; cases reported and patients
presented, 229; and pathological specimens and special patholog-
ical reports, 104; total 616.

"A study of this wealth of material shows that scarcely any-
thing has been brought before the society which has not had
some interest, and that some articles of great importance, and a
few that may be classed as among the most valuable contributions
to neurology during the last twenty years are to be found. During
the twenty years about 140 meetings of the society have been
held, so that the average number of contributions at each meeting
would be between four and five.

"It is difficult to single out particular contributions from a
society's proceedings of two decades for special mention, but a
few of the most important of these are S. Weir Mitchell's edema
in hysterical hemiplegia (1884); Dercum and Parker's paper on
the artificial production of a hysterical state with convulsive mani-
festations (1884); the nuclear anatomy of the nerves which sup-
ply the muscles of the eyeball, by E. C. Spitzka (1888); Lloyd's
traumatic affections of the cervical region of the spinal cord sim-
ulating syringomyelia (1894); a case of merycismus, by Riesman
(1895); experimental lesions of the cortical tissues of the rab-
bit's brain induced by alcoholic poisoning, by Berkley (1896);
gliosis cerebri, by Sailer (1897); J. K. Mitchell's headache with
visual hallucinations (1897); the report by E. Lindon Mellus of
original investigations on motor tracts in the brain and cord
(1898); and Spiller's Pepper Laboratory contribution on a case
of amyotrophic lateral sclerosis showing the extent of the motor
cortex in man (1899)."

Following the plan of enumeration used by Dr. Mills in re-
cording the work of the first twenty years of the society, an ex-
amination of the minutes of the scientific proceedings shows that
during the last decade 568 contributions have been made. This
record indicates that while during the first twenty years the
average number of contributions for the year was about thirty or
in the seven monthly meetings between four or five for each, in
the last ten years the average almost doubled, being annually 56

or about 8 for each meeting. The analysis of these 568 contributions shows that 153 were formal papers, 14 were minor scientific contributions, 370 were cases reported and patients presented, and 31 were pathological specimens and special pathological reports. While the number has increased their value has not diminished.

During the last decade several important symposia and special meetings have been held. The first of these was a combined meeting of the society with the New York Neurological Society on November 24, 1906. At this meeting cases which had been chosen because of their unusual interest were shown by Drs. Burr, McConnell, Mitchell, Rhein, Gordon and Weisenburg, and an important paper was read by Dr. Spiller on " Psychasthenic Attacks Simulating Epilepsy." Dr. H. S. Fraenkel of Berne, Switzerland, was present and discussed several of the papers, especially that on tabes, giving particular attention to an exposition of his methods of treating ataxia by systematic exercise. The presentation of these cases preceded the main topic of the symposium which was a consideration of Marie's views of aphasia, which was discussed by Drs. Mills, Dercum, and Lloyd and by Drs. E. D. Fisher and M. Allen Starr of New York and Fraenkel of Berne.

On March 26, 1909, the distinguished bacteriologist of the Rockefeller Institute, Dr. Hideyo Noguchi, enlightened the society with a valuable demonstration of a new and simple system of the complement fixation test, and of the butyric acid test for syphilis and parasyphilitic affections.

A second combined meeting of the New York and Philadelphia Neurological Societies was held in Philadelphia, December 18, 1909, at which, in the first place, a series of cases was shown by Drs. Potts, Mitchell, McConnell, Dercum and Allen. In the second place, Drs. Spiller and Frazier contributed a paper with illustrative cases on the treatment of spasticity by resection of the posterior spinal roots and another article was contributed by Dr. Frazier on division of the auditory nerve for persistent vertigo and tinnitus. Dr. Mills introduced the special subject for discussion which was the clinical study of changes in sensibility due to organic and functional disease, especially with reference to the methods of testing. This paper was discussed by visiting members from New York and some of the members of the society.

On February 24, 1911, Dr. Sidney I. Schwab of St. Louis opened a discussion on the Freudian theories of the neuroses by an instructive paper entitled " An Estimate of Freud's Theory of the Neuroses and Its Value to the Neurologist."

A special meeting of the Neurological Society was held on Friday, November 10, 1911, in honor of the Congress of Clinical Surgeons of North America. At this meeting the following program was presented:

Dr. Hugh T. Patrick of Chicago: "The Technique and Results of Deep Injections of Alcohol for Tic Douloureux." Dr. Harvey Cushing of Baltimore: "Some Clinical Types of Disordered Function of the Pituitary Body," Dr. A. R. Allen of Philadelphia: "Operative Treatment of Experimental Lesion of the Spinal Cord Equivalent to the Crush Injury of Fracture Dislocation of the Spinal Column."

On February 27, 1914, at a special meeting for the discussion of aphasia papers were presented by Drs. Mills, Dercum, Burr, Lloyd, Rhein, Spiller and Weisenburg. The older or classical views of aphasia, Liepmann's doctrine of apraxia, the relations of aphasia to mental disorders and the special significance of anarthria were leading subjects of discussion, and Dr. Spiller presented specimens from the Laboratory of Neuropathology of the University of Pennsylvania showing lesions causing aphasia situated at various positions in Wernicke's zone, the lenticular zone and Broca's convolution.

The papers and discussions of all the symposia referred to were of a high order. The society held special return meetings in New York and Boston in combination with the New York Neurological Society and the Boston Society of Psychology and Neurology.

Time will not permit me to review in detail the contributions of individual members of the society to some of which however I would like to make brief reference. There is no doubt that in some instances the omissions will be quite as important as the inclusions; indeed I have found it difficult to discriminate as to what should be recalled, owing to the wealth of material at my disposal.

Dr. William Pickett, whose loss is sadly remembered by the society, shortly before his death presented several careful psychiatric and neurological contributions, including an elaborate

statistical and general study of puerperal insanity based on work at the Philadelphia Hospital for the Insane.

Dr. John K. Mitchell among other valuable contributions gave to the society studies of some phases of tabes and recorded a number of cases of much diagnostic and therapeutic importance.

Dr. C. W. Burr in this period of ten years has presented besides several formal papers a series of instructive and in some instances unique cases, among which were cases of epilepsy with myoclonus, paralysis agitans in the negro, tetany involving one side of the body, and mirror writing.

The variety and value of the contributions to the proceedings of our society by Dr. William G. Spiller are such that it is difficult to properly recognize these in a brief retrospect. Twenty-five papers and twenty cases were presented by him during the last decade, he contributing also numerous pathological specimens.

A few among his formal papers of special interest were those on multiple motor neuritis (with Dr. Longcope), the clinical resemblance of cerebro-spinal syphilis to disseminated sclerosis (with Dr. C. D. Camp), the syphilitic form of multiple sclerosis, dissociation of sensation in pontine lesions, the treatment of spasticity by resection of the posterior spinal roots (with Dr. Frazier), and traumatic brachial neuritis, probably caused by tearing off the nerve roots; while among the interesting cases which he presented were one of polioencephalitis superior and inferior involving the corpora quadrigemina, one with bilateral spasticity and athetoid movements, one of hemicraniosis, and one of dystonia musculorum deformans.

Notable among the contributions of Dr. C. S. Potts have been those on pseudo-sclerosis (with Dr. Spiller), and cases of traumatic cervical hematomyelia, periodic paralysis, tic of the tongue, and encephalitis due to gasoline poisoning.

Dr. D. J. McCarthy, from his rich experience at the Phipps Institute and elsewhere, contributed to our proceedings papers and cases dealing with the various phases of tuberculous involvement of the nervous system and other contributions by him worthy of note were on ascending paralysis, psychoanalysis considered apart from the Freud concept, and the hemosiderin infiltration of the wandering cells of the pia-arachnoid, the last presenting a subject of rare interest.

Instructive and interesting cases were presented by Dr. J. W.

McConnell including a case of postero-lateral sclerosis with involvement of the cells of the anterior horns, one of voluntary monolateral ocular movement, and one of aphasia and apraxia with unusual associated movements. A specimen exhibited by him showing the limitation of the face area in the human cortex was a distinctly valuable contribution to accurate cerebral localization.

The list of contributions by Dr. Alfred Reginald Allen includes annular degenerations of the spinal cord, the distribution of the sixth cervical anterior root in the cervical spinal cord, and a symptom-complex of transverse lesion of the spinal cord and its relation to structural changes therein. His presidential address on psychoanalysis in June, 1912, will also be especially recalled.

Dr. John H. Rhein's paper discussing apraxia in relation to aphasia will be remembered by members of the society as one of the most valuable contributions to the subject to which Liepmann has given so much attention. This article since its publication has been much cited both here and abroad. A paper by Dr. Rhein on spastic paraplegia is also worthy of special note, and his list of cases presented illustrated a variety of interesting or unusual clinical types.

The presidential address of Dr. George E. Price, June 23, 1914, on a "Sixteenth Century Paranoiac" was as entertaining as it was instructive and represented work in a field not much tilled by members of the society. To Dr. Price the society also owes the discussion of two forms of familial disease—one of migraine in a large family associated with unusual sensory disturbances, and the other, spinal gliosis occurring in three members of the same family.

Papers by Dr. S. D. Ludlum on neurofibrillary changes, on regeneration of the peripheral nerves and various serological contributions in collaboration with Dr. E. P. Corson-White, have greatly enhanced the value of our proceedings.

Worthy of particular mention are the papers and cases of Dr. Williams B. Cadwalader on a case of segmental astereognosis resulting from a lesion of the parietal area, the pathology of acute anterior poliomyelitis, a case of unilateral optic atrophy and contralateral hemiplegia consequent upon an apoplectic attack, and pituitary and uncinate symptoms and lesions (with Dr. Mills).

The contributions of Dr. S. D. Ingham include encephalitis with a report of two cases with necropsy, and a case of cerebro-spinal syphilis with internal hydrocephalus causing symptoms of cerebellar tumor.

The record of cases of unusual interest in some instances is so large and has been added to by so many members of the society that it is difficult to make any discriminating reference to them. Dr. Alfred Gordon, for example, among other cases and contributions has reported a specially instructive case of neurofibromatosis, several cases of myatonia congenita, a series illustrating unilateral ascending and descending paralysis, bulbar palsy with total aphemia, a neuritic form of syringomyelia, and a case of hemiplegia with hemiatonia probably due to lenticular lesion. To Dr. Samuel Leopold the society owes the presentation of specimens of osseous plaques of the spinal pia-arachnoid with a discussion of their relations to pain in acromegaly, and cases of unilateral cauda-equina lesion.

Dr. N. S. Yawger's contributions on indurative headache and colloid bodies in the central nervous system will be especially remembered, the first involving consideration of a therapeutic measure of great value and the second as of much pathological interest.

The physiology of the cerebro-spinal fluid as a problem in intracranial surgery by Dr. Chas. H. Frazier was a comprehensive and excellent study of the nature and functions of the cerebro-spinal fluid.

Among the contributions of Dr. C. D. Camp, now clinical professor of neurology in the University of Michigan, were preeminently, a study of six cases of paralysis agitans and another paper on multiple sarcomata of the brain and cord (in collaboration with Dr. Burr). He also brought before the society a variety of cases, all of particular interest.

To two of our out-of-town members, Dr. Tom A. Williams, of Washington, and Dr. C. M. Byrnes, of Baltimore, the society is indebted. Among the interesting cases presented by the former should be mentioned variable migrainous recurrent paralyses followed by permanent lateral homonymous hemianopsia, cerebellar disease and bulbar thrombosis resulting from malaria, and interesting cases in which the value of psychoanalysis was dem-

onstrated.   Two important contributions of Dr. Byrnes embodied
an interesting description of a new instrument and method of
directly injecting the gasserian ganglion for the relief of pain
in tic douloureux and an account of a new method of injecting
mercury directly into the spinal canal for the treatment of syphilis.

THIRTIETH ANNIVERSARY DINNER

The dinner in celebration of the thirtieth anniversary of the society was held at the Philadelphia Art Club, November 28, 1914, at 7:30 o'clock. Sixty-six members and invited guests were present. In accordance with the program arranged responses to toasts were first made by Dr. George W. Jacoby, of New York, president of the American Neurological Association, by Dr. Morton Prince, of Boston, by Dr. Hugh T. Patrick of Chicago, and by Dr. Henry M. Thomas, of Baltimore. In addition to these responses remarks were made by Dr. George E. deSchweinitz for the College of Physicians of Philadelphia in the absence of Dr. James C. Wilson, president of this association, by Dr. William Duffield Robinson, president of the Philadelphia County Medical Society, and by Dr. S. D. Risley, president of the Philadelphia Medical Club. Dr. Graeme M. Hammond of New York also spoke in response to a call by the president. A letter was received from Dr. William L. Rodman, president-elect of the American Medical Association, expressing his regret that an unexpected call out of the city had prevented him from being present at the dinner as he had expected. In his letter he extended his congratulations to the society, expressing his appreciation of its high position in American medicine.

THE AMERICAN NEUROLOGICAL ASSOCIATION

By George W. Jacoby, M.D.

The present world war has cut so relentlessly and so deeply into all conditions of life, even into those that are apparently unrelated to it, that it may well serve as an introduction to remarks upon any subject whatsoever. Every conversation at this time of unexampled stress and affliction turns about the war, starts from or ends with it. For us, as medical men, there are in this state of affairs yet other considerations, aroused by the reflection that it is the task of war to destroy human life while the prime object of all medicine is to preserve it, and that science in general must be most seriously affected in so far as the international exchange of ideas, that most powerful impetus to scientific research, has been brought to a complete standstill. This of course can be but temporary, for no matter how much political and economic interests may collide, science is and must remain international. But while we are waiting for a reëstablishment of international relations, scientific investigation must keep on. Scientific work can find no respite for it represents the true neutral domain upon which all partisan strife must cease and upon which alone the logic of facts can count. True science is not the one that invents machines of war and furnishes nations with instruments of destruction, but the one that unites the noblest and the best minds in the common endeavor to exterminate ignorance, prejudice and superstition, the worst enemies of progress, and to do so not with mines, airships and 44-centimeter guns, but with the weapons of the intellect.

It is to such warfare we have devoted our lives and it is as representatives of such warfare that I address you to-night in behalf of the American Neurological Association.

Gentlemen, that association founded in 1875 was also the scene of many a stormy battle. In fact, its very baptism was a troublous one, for no sooner had it elected S. Weir Mitchell, of Philadelphia, as its first president, than for some occult and never to be disclosed reason, he declined to accept the office and J. S.

Jewell, of Chicago, was selected the standard-bearer of the association. Having secured a president, the association determined to retain him and Jewell was reëlected and reëlected until he had served for four full years. During those first years, I have been told, and subsequently, I know, the association proceedings were of the liveliest and frequently of the most belligerent nature. The membership then was small, for of the 35 who accepted the invitation to be present on the 2d, 3d and 4th of June, 1875, the first meeting of the association, but twenty came and only sixteen names are to be found as original members of the association. Of these, three came from Boston, three from New York, two from Baltimore, two from Philadelphia and one from Albany, Brooklyn, Chicago, Kankakee, New Orleans and Washington.

I shall refrain from developing the history of the association, for such a history would mean giving a history of the progress and growth of neurology itself. Most of the genuine original work in neurology done in the United States during the past forty years has been first presented to the American Neurological Association for criticism and endorsement, and the names of almost every American worker in neurology who has contributed anything of worth, will be found represented on its list of membership. In other words it is in the truest sense a national association of specialists. Nor shall I individually mention the names of those who have been most prominent in the association's work, for should I do so, I fear you would think I was undisguisedly and broadly trying to heap encomiums upon the city of Philadelphia.

Many changes have naturally taken place in the association since it was my good fortune to be admitted as a member. Energetic young workers have come in by the score and of the older ones many have paid their debt to nature and left us to give battle alone.

A long list of dead today forms the honor list of our association. Men whom we should never forget and should always recall with gratitude, for it is their shoulders that serve us as a point of vantage from which to enlarge our horizon. Of these I do want specially to mention the names of three men in whose work all speculation, whether philosophically or theologically colored, was *a priori* excluded and whose device was "exact investigation and facts." How different from some neurologic

fantasts of recent years. These are J. S. Jewell, Thomas A. McBride and William R. Birdsall.

Jewell, of Chicago, the first president of the association, was but fifty years old when he died in 1887. He was an indefatigable worker, a pioneer in many ways, one of the founders of the JOURNAL OF NERVOUS AND MENTAL DISEASE and for years its chief editor. No one who was present at the meeting of the association he last attended can forget his brilliant mind, his charm of manner and conversation and the contrast furnished by his emaciated body.

McBride died in 1886 at the age of forty-two. He was a man of the kindliest and most generous disposition, of a broad liberal scientific spirit, and one in whom was most happily blended the qualifications of a general clinician and neurologist.

Birdsall was above all my intimate personal friend. Our lives were closely intertwined in Vienna, Paris and New York. His unselfish devotion to everything that seemed noble and true have enshrined him in the memory of all those who knew him well. His brain was that of a scientist, his heart that of a child.

But enough of persons and facts. There is and always has been another phase of character, that seems to me to be individual to the American Neurological Association and that is its capacity for social enjoyment. What Pericles said to the Athenians I might say of the American Neurological Association. He says: "Our laws have further provided for the mind most frequent intermissions of care, by the appointment of public recreations, elegantly performed with a peculiar pomp, the delight of which is a charm that puts melancholy to flight."

If there be any here to-night who have not taken part in one of the association's social functions, I can but say, make good your loss, for, as Kipling says:

> When you grow older and skin your shoulder
>   At the world's great wheel, in your chosen line,
> You'll find your chances as time advances
>   For taking a lark, are as slim as mine.

Now Mr. President and gentlemen, let me bring these remarks to an end by expressing to you my great pleasure at having been honored by this invitation to be with you to-night and as spokesman for the American Neurological Association, to call to the Philadelphia Neurological Society an " Ergo Bibamus."

AMERICAN NEUROLOGY OF THE PAST—NEUROLOGY OF THE FUTURE.

By Morton Prince, M.D.

In speaking of "American neurology of the past" one's thoughts naturally turn back to the successive problems of the times and to the men who were occupied with their solution. I have been exceedingly interested in looking over the early Transactions of the American Neurological Association and noting the differences in the problems which came up from time to time and occupied the thought of each epoch. Each epoch has its own problems, but those problems are brought to attention by the discovery of new facts giving a new viewpoint of old problems hastily assumed to be settled; or by the realization of truths forced upon us by changing conditions, or by needs to which previously we were oblivious. Each new discovery in science opens, as it were, the gate to a new field into which rush the explorers who proceed to search in systematic manner every inch of the soil for golden nuggets or precious stones of knowledge. And then, that field exhausted, there is a pause until a gate to a new field is opened by some pioneer, and again there is a rush of explorers to discover what previously unsuspected truths may there be found. Necessarily there became ranged about the problems of an epoch the names of those master minds, of those inspired by the call of discovery, who contributed to their solution. I say "contributed," for rarely if ever has any one man completely solved any problem. Indeed no problem is ever completely solved in the true sense. It is with these considerations in mind that I would review, however, cursorily, "American neurology of the past."

The American Neurological Association was founded in 1875 —forty years ago coming next spring; i. e., ten years before the founding of your society. As you run over the names of the original thirty-five members I think you must be struck with the fact that, with a few notable exceptions like W. A. Hammond,

J. J. Putnam, Webber, Seguin and Hamilton, the membership was
not one of specialists, men who devoted themselves exclusively to
neurology: it was in the main rather of internists who had a
greater or less interest in neurology. Indeed some of the mem-
bers had acquired their chief distinction in the practice of general
medicine or in other fields. Among these I may mention the
well-known names of Pepper and H. C. Wood, of Philadelphia,
Edes and Edward H. Clarke, of Boston, Hun, of Albany, Dalton,
of New York, and Miles of Baltimore. Correspondingly the
papers, with important exceptions, took on rather a clinical and
theoretical type during the first few years. Nor is one impressed
with the problems as being of very profound significance.

Gradually, you will notice, there was an influx of young men
who devoted their activities wholly or most intensively to neurol-
ogy until, about the date of the founding of your Philadelphia
Society thirty years ago, there had arisen a group of thoroughly
trained American neurologists. It seems to me therefore fair
to say that American neurology, or at any rate the beginning of
the great advance in neurology in America was coincident with
the founding of your society.

The theme then, of which I would sing is of the problems of
neurology in the twenty-odd years long epoch, beginning with the
early eighties, and of that group of pioneers who contributed to
their solution. This is all the more a pleasing theme because it
takes us within the sphere of activity of the oldest and older of
those still in harness, many of whom I see here present tonight.

If we would view this group of early American neurologists
and their problems, in true perspective, we must remember that
at a preceding epoch, not so very long antedating this one,
neurology was necessarily largely clinical and theoretical from
lack of anatomical data. It was a *clinical and theoretical school.*
Close observers of the clinical manifestations of disease, the
neurologists of this school, were obliged in the existing unde-
veloped state of normal and pathological anatomy, to rely to a
large extent upon speculative reasoning to furnish the underlying
pathology. And yet, trained to think profoundly, they often
forecast the future objective demonstrations of later schools by
pure reasoning. Thus Hughlings Jackson may be said to have
laid down the *principle* of cerebral localization on theoretical
grounds.

Then the rise of the great anatomists, represented by Stilling, whose work will always remain a classic, and Meynert, not to mention other notable contributors, made possible the succeeding school which sought systematically to correlate clinical observations with normal and pathological anatomy. This school may be termed *clinico-anatomical*. It was, of course, a tremendous advance. The discoveries in the anatomy of the nervous system had given a new aspect to old problems, and had opened new problems which before were not thought of. At the same time the investigations of this school contributed enormously to our knowledge of normal and pathological anatomy and of the physiology of the nervous system. Its method was the only method by which the problems of organic neurology could be scientifically approached.

Of the more illustrious of this school I may mention only a few. The names of Charcot, Duchenne, Westphal, Leyden, Kusmaul, Erb, Ferrier, Hitzig, Buzzard, Bramwell, Strümpell, and Friedreich, Weir Mitchell and Hammond, stand out in bold relief, though others might with equal justice be mentioned.

Although neurology belongs to internal medicine, the almost unbroken character of the ground at that early period, and the complexity of the problems presented, required intensive study and therefore men who at least specialized in this field. It is interesting to note that many of the men I have mentioned who developed neurological " kultur "—and it is true of others—were general internists but men who gave their most intensive energies to neurology. They were mostly clinicians, but the problems they solved were more than clinical; they were pathological, physiological, anatomical, etiological, and surgical, and, to an extent, psychological. This is true in a measure, I think, of the whole of internal medicine but it was more peculiarly true, I think, of neurology of that period. Thus there was developed to meet the needs, a group mostly of Europeans of great brilliancy; but that group had worthy successors in the brilliant group of American neurologists of the same clinico-anatomical school but of the next epoch to which I will presently come.

At this time Weir Mitchell and the elder Hammond, who have given us worthy successors in their sons, were both at the height of their fame. Mitchell had done his classic work on " Injuries

of Nerves " and his treatment of neurasthenia had spread through
Europe as well as America and everywhere was in vogue.   Ham-
mond's text-book was the accepted text-book on nervous diseases
in our colleges, and remained about the only thing in English
until the youthful Hamilton produced his work.   Then there was
Beard who had recognized the functional character of a medley
of theoretical organic diseases, rivalling in their multiplicity and
variegations the races making up a European empire, and unified
them in one general functional concept *neurasthenia*.   Spinal
congestion, spinal irritation, cerebral congestion and anemia, " con-
gestion at the base of the brain," then lost their autonomy and
were wiped from our neurological slates.   He also recognized
the phobias as at least symptom complexes.

Then there were amongst the earlier men who are not with us
now, Spitzka, keen as a rapier and unrivalled as an anatomist;
and Seguin by whose early death neurology lost one of the ablest
minds and most accurate and thorough observers.   He with Shaw
and Miles, in 1877, was the first to contribute to cerebral local-
ization.

I did not become a member of the Association until late in
the eighties: then I found that there had preceded me that group
of neurologists, my contemporaries, most of whom are still with
us.

As I look back now to that early American epoch there is
one thing that strikes me as rather remarkable and that is the
youthfulness of the majority of that group.   They seem to me
now as having been at that time mere youths, and yet nearly one
and all had already attained an enviable reputation—some had
reached eminence.   I doubt very much if that group, in this re-
spect, can be paralleled in any other field of medicine.

It will be interesting now to take a glance—but it can only be a
glance—at some of the problems which sprang up in the night, as
it were, during this later clinico-anatomical period and with which
the names of American neurologists have become honorably as-
sociated.   As these problems of the past come to my mind many
names arise too, but my memory is guided simply by the remi-
niscent mood of the moment unaided by any attempt at search of
the literature.   Undoubtedly my memory will miss many names
which should be recalled.

First and foremost there were the great problems of cerebral

and spinal localization. These sprang at once to the front, stimulated by the epoch-making researches of Ferrier and Hitzig carried on by the experimental method on the brains of animals. It became the task of neurology to confirm the evidence in man and extend our knowledge by clinical and pathological data.

And then there followed the problems of surgical operations on the brain and spinal cord, to which Horsley gave the first impetus by his original and daring operations on the brain. To the solution of one or more of these problems many American neurologists have contributed, but I am sure that all will rejoice to recall the names of Mills, Starr and Dana as pioneers and the most systematically engaged at this epoch with these problems, Dana more especially in connection with sensory localization. We are all glad to acknowledge in particular our indebtedness to your president, Dr Mills, who, still animated by the persistent and unabated enthusiasm of his youth, has never ceased to make enlightening contributions. I said "systematically engaged," for the important contributions of Seguin, J. J. Putnam, Knapp, Lloyd, Walton, Dercum, Collins, and Spiller should not be forgotten; nor, I doubt not, those of others. Your Spiller seems, like Socrates, to have constituted himself a neurological busybody and concerned himself with about everybody else's problems as well as his own and illustrated them all.

The recognition and differentiation from myelitis of *multiple neuritis* was another problem of this epoch. Then there were the *dystrophies,* as distinguished from the spinal atrophies; the *syphilitic etiology of tabes* originally enunciated, I think, by Erb; *myxedema* as a glandular disease; *syringo-myelia* and the varieties and pathology of *aphasia.* To each of these there were many American contributors and I should fear to particularize.

We older fellows remember the hectic war waged over the pathology of the traumatic neuroses. This apparently inoffensive and innocent little scientific problem had been as a very Balkan question to the peace of neurology, arraying brother against brother, even unto a titanic struggle between those two renowned pacificists whom I need not mention, not only in what—by a euphemism—might be called scientific discussions, but in the hardly less polemical expert arena of the law courts.

It was largely the influence of the French and American schools that gave us our modern functional conception of these

neuroses. With this conception J. J. Putnam and Walton are closely associated as pioneer contributors and exponents, while Knapp was persistently engaged with the enlargement of our knowledge of the symptomatology and of the hotly contested prognosis (when he wasn't engaged in battling with Walton.)

With *adiposis dolorosa* one name alone comes to mind— that of Dercum, who enjoys the enviable distinction of priority of discovery. Obviously I cannot review all the problems of the period and the work of those engaged thereon, but I cannot pass over those of Little's disease and amaurotic family idiocy, for the elucidation of which we are deeply indebted to Sachs.

With the discovery of *diffused sclerosis* in *anemia* and *debility* the names of J. J. Putnam and Dana will always be associated. I pass over family periodic paralysis, which Taylor has so well illuminated, the various problems raised by Graves' disease, and even the great contributions of Cushing to diseases of the hypophysis cerebri. These last belong to a succeeding epoch. The younger men who will succeed their sires must wait for their own historian, I'm sure none shall say, apologist, who will reminisce as I have done.

Neurology of the Future

What of the future? Have all the great problems of neurology been worked out? So some of our pessimistic confrères, who sometimes give us the blues, would have us believe; and are we prepared to hand over the field as fully tilled to general internists? This is surely a superficial point of view. There always will be problems requiring the intensive study of specially equipped investigators. No problem is ever or can be ever completely worked out. New data require new points of view, old accepted explanations have to be revised in the light of new knowledge, newly perceived relations examined. Often when a problem has been accepted for a long time as solved, we lose sight of the fact that what we accepted as a solution was only an interpretation, a theory, and not a fact; and in the light of new data the theory must be discarded and a new explanation found. Witness the once accepted theory of the transmission of phthisis by direct heredity as affected by the discovery of the tubercle bacillus and that of "laudable pus," which many of us here were taught before Lister's discoveries.

In neurology, take the theory of the parasyphilitic pathology of general paralysis and tabes as affected by the discovery of the spirochete in the tissues—what a problem this opens in the field of therapeutics! Marie's bomb tore to tatters our previously accepted schematic conception of aphasia but has left us with only crude, inadequate theories of function. Here is a problem for the future of a most intense interest. Our knowledge, perhaps, satisfies, though not wholly adequately, the practical needs of clinical diagnosis but not of brain physiology. It is really a psychological problem. I have yet to read of a case adequately studied in view of the requirements of the problem.

I suppose I shall shock every dyed-in-the-wool "localizationist" if I suggest that even the present doctrines of the cerebral localization of functions must be regarded as crude and provisional in many respects. I mean so far, at least, as they pretend to locate psychological and even physiological " functions." If I am right the problems will have to be completely restudied in view of the inconsistencies of accumulated data and a newer conception of brain physiology. As von Monakow has pointed out, cerebral localization is a clinical conception rather than a psycho-physiological or functional one.

It is enough simply to point to the almost wholly new problems that have sprung to life by the discoveries in bacteriology, serum pathology and the parts played by internal secretions. When one thinks of the almost unknown laws of heredity and of the relations of mental defects to crime, what a multiplicity of practical problems awaiting future solution crowd into the mind!

Clinico-Psychological School

I have thus far spoken only of those past and future problems which can only be solved by clinico-anatomical methods. But there are pressing problems in another domain which, if I were guided by tactfulness, I would approach on this occasion with hesitation because their agitation seems to have the singular effect of disturbing the mental peace of this good City of Brotherly Love. Methinks I hear now the distant rumblings of the coming storm! I refer—you already guess it—to the problems of functional neurology and the psycho-neuroses which are to become some of the important problems of the future.

Unfortunately this field has been, until recently, strangely

neglected; I would be within the bounds of moderation if I said, shunned. I said " unfortunately " and " strangely " because fully 75 per cent. of all the nervous ills which torment and destroy the happiness and well-being of humanity, as represented in neurological clinics, belong to the functional category. I forbear to dilate upon what is obvious even to a layman, that the disregard of the study from the functional point of view, of these affections, by trained neurologists, has left the field to be explored therapeutically, and therefore, pecuniarily, by charlatans, mindcurists, Christian Scientists, osteopathists, and all the various therapeutic sects who have found the failures of the medical profession a rich harvest for their own profit.

The reasons of this deplorable short-sightedness I will not go into beyond mentioning the difficulties of the problems and the necessity of leaving the anatomical viewpoint.

A new clinical school of research has invited the activities of many neurologists, psychiatrists, and internists who have clearly recognized that clinico-anatomical methods are as absolutely inadequate to solve the riddles of the psycho-neuroses as they are of normal psychology. This new school, in contradistinction to the clinico-theoretical and the clinico-anatomical, may be termed the *clinico-psychological*. You younger men, with your elastic minds, your energies unabated by time, your scientific curiosity undulled, will take up these problems of the psychoneuroses by the new methods and from the vantage point of the new knowledge.

Obviously, when the problems by their very nature do not admit of one avenue, or mode, of approach, another must be found, even if it be less easy and congenial. I remember a good friend and classmate of mine, a member of the A. N. A., once said to me " Drop your investigations into hysteria. Hysteria has been the grave of every neurologist who has attempted to study it, including Charcot." He may have been right, but it is in order, I think, to remind him that Charcot's fame still lives, and I can show him the liveliest group of corpses that he ever set eyes on. Another distinguished neurologist and member of your Society, for whose attainments I have the highest respect, wrote me, I must believe, out of the kindness of his heart, that " studies of this kind can be better done by a policeman or a detective than by a gentleman."

Psycho-pathology seeks to unravel the complexity of motives or motivating forces, if you prefer, which determine mental behavior and to follow their impulses to their last effects in the human organism. It would be as useless to try to explain such problems by the use of the anatomical method as it would be to seek to explain, why Smith hates Jones or is jealous of Brown, by a congested optic thalamus. Some irreverent wag might be brutal enough to remind you that the real reason is because Jones punched a hole in Smith, and Brown had robbed him of his best girl.

Will you say I am untactful if I remind my anatomical friends that even if a hypothetical toxemia be accepted on theoretical grounds as a fundamental factor in dementia-præcox and manic-depressive insanity, that toxic principle in no way explains why a given demented person, for instance, thinks his body is made of glass or why the melancholic individual thinks he has committed the "unpardonable sin." Surely, the toxic explanation is as inadequate as it would be to explain the symptoms of tabes by the mere fact of infection by the spirochete.

For all such problems you will require as a fundamental prerequisite a knowledge of that great functioning mechanism, the subconscious. Their solution will require the discovery of the modes of activity by which it determines mental and bodily behavior. The subconscious may be likened to the works of a highly complex clock. These works are hidden out of sight. We are aware of the sounds of the chimes, the movements of the hands, of the procession of the signs of the zodiac, and the days of the month and of all the other accessories, but nevertheless it is the hidden works which determine these revealed movements that constitute the behavior of the clock.

Of late we have heard a great deal of German "Kultur." Well, there is a special World culture belonging to each of the sciences and which every scientist must attain in his own branch if he would be admitted into the "Society of Scholars." An important part of neurological culture of the future will be an understanding of the subconscious. Soon every neurologist will seek at least a working mastery of it. This culture already has permeated and strongly influenced the psychology of the universities, though, curiously enough, its chief source is to be found in the investigations of medical men.

The problems of the psychoneuroses are the problems of the subconscious. The subconscious is the great problem of the future that awaits you. This you younger men will take up and I doubt not you will solve it despite its perplexities and the difficulties of finding the true interpretation of its phenomena.

This is the message of the future I bring you—this is the gospel of culture I preach!

NEUROLOGY IN THE WEST

By Hugh T. Patrick, M.D.

Mr. Toastmaster, Members of the Philadelphia Neurological Society and Guests: You don't know it but your toastmaster has just given a beautiful demonstration of his psychotherapeutic skill. Ever since the scientific meeting last evening I have been suffering with an acute and violent attack of what they call in Boston symposiarchophobia and in Pittsburgh logophobia post-prandialis, but his kind and tactful introduction has practically cured me. To be sure I am liable to relapse any minute but for the time being he has made me feel quite like another little country mouse of which you may have heard. The clinical history runs like this:

A farmer had spilled a little pool of whiskey on the barn floor. After he went away a mouse crept out, took a sip, scampered back to his hole and thought. Presently he came out, took another sip, went back and thought some more. Then he came out and took a big drink. Then he hopped upon a peck measure, stood up on his hind legs, bristled up his whiskers and said, " Now bring on that damned cat."

So, being pleasantly intoxicated by Dr. Mills' gracious words, I can proceed without intention tremor. First, I wish to express my sincere thanks for the kind invitation which allows me to be here this evening. I am proud and happy to bear from the west to the Philadelphia Neurological Society hearty greetings for the present, sincere congratulations for the past,—and for the time to come the confident hope that your younger and coming generations may not only prove worthy of their golden legacy but may make the future of this great society even more glorious than its past.

As to neurology in the west. Well, we sense the feelings of the old colored man who was sitting in the sun by the grocery door when a man stuck his head out and said, " Uncle, can you give me change for a ten dollar bill?" " No boss, no suh, I can't change no ten dollar bill but I do thank you fo' the

compliment." To think that you assume that there is a "neurol-
ogy in the west" is most agreeable. It has a lovely sound. But
it must be confessed that our neurology may be symbolized by
something like the shadow on an adolescent's upper lip,—the sub-
stance of things hoped for, the evidence of things not yet seen.
While neurology in the west may be spelled with the same letters
as in the east it is writ exceeding small. Our infant feet are still
trustfully toddling where you lead. We all know that westward
the star of empire takes its way,—but sometimes like Tam
O'Shanter it seems to be mighty reluctant to start; especially the
star of neurological empire. That still hangs low in the east
and we have no reason to suspect that in the immediate future
the neurological guide posts will be pointing west.

The contrast between eastern and western neurologists may
be expressed in different ways. We of the west are perhaps a
little like some of the blue-stocking yankees who have come out to
us. They still have the New England conscience but with western
adjustments. We may be said to resemble eastern neurologists
with western adjustments; sometimes a good deal more adjust-
ment than neurology.

Your neurology of 25 years ago is remarkably like ours of
today. Yours of today may be ours of tomorrow. At any rate,
we like to think that the western neurologist is not a class, much
less a genus, possibly not even a species, scarcely a variety;
simply an ephemeral form due to transient environment and
though not having your erudition, still having the three essential
B's: that is, blood, brains and backbone of the eastern 1915
model.

There are still other contrasts. Neurologists, like society,
may be divided into the observed, or responsible and observers,
or irresponsible. We of the west belong in the latter category
which is much less important but, I sometimes think, quite as
much fun as the former. I wonder if you responsible observed
ever say to yourselves

> O, wad some power the giftie gie us,
> To see ourselves as those chaps see us.

I suppose you never do but if you do and if some power would, I
know you would be pleased. We are perfectly sure, as O. Henry
says, that you are "advised about all the branches of information

contained in learning." You may have noticed that like the confirmed visitor of art galleries, we have developed a sort of mental torticollis from constantly looking up to you. And still at times you are beautifully human. Occasionally the luster of your culture is dimmed by pedantry and once in a while we seem to detect a little intellectual tenesmus. One or two of your longer articles have made me think of the experience one of my patients had with a colored waitress who gave notice. The mistress didn't want to lose her and said,—"Why, Eliza, haven't we always treated you well?" "Yas'm, but in dis yeah family dey am too much shiftin' ob de dishes fo' de fewness ob de vittles." Some of these large literary vessels carry but little meat. And once,—I think only once—an abstruse lucubration of esoteric theorizing and recondite philosophizing reminded me of an incident at the old tanyard in my native village where we boys used to gather to tumble on the tan bark. The owner, for a sign, had bored a hole in the wall near the door and stuck a calf's tail into it. One day he noticed a man looking doubtfully at his sign but he didn't go in. So the tanner came out and inquired, "Want to buy some leather?" "No." "Got some hides to sell?" "No." "Are you a tanner?" "No." "Are you a farmer?" "No." "Well, what do you want?" "I am a philosopher and for half an hour I've been trying to figure out how the calf got through that auger hole." Who wrote that abstruse paper? If you don't remember I shall not tell.

Neurologists may also be divided into producers and consumers. Here, again, we belong in the second class. But all consumers, like other fledglings, have appetites. And I venture to remark to you producers that just now some of us are hungering, perhaps quite unreasonably, for a better neurological technique. On surgical technique huge tomes have been written and are now in the writing. A good one on how neurologically to do things would be really satisfying pabulum. I do not mean that sublimation of the culinary art, laboratory technique; nor do I mean the technique of physical examination which somehow savors of the cleverness of a Sherlock Holmes on the trail of a lesion,—but a technique which will enable us to explore not a man's body but the man himself and to identify not his diseases but, what is of vastly greater importance, his disorders. Here is neurological territory almost unexplored. I think our cyclops-

eyed friends, the Freudians, are faithfully trying to get a squint at it through a gun barrel, but most of us, and most of you, pursue the beaten path and let the primeval wilderness alone.

In the neurology of out-west, then, there is much that is lacking, much that is primitive. But if we are embryonic in our attainments we are full-grown in our feelings and here in this city of brotherly love, with all my heart I tender to you of the east our admiration, our gratitude, our loyalty and, more than all, our personal affection.

NERVE DOCTORS AND OTHER DOCTORS

By H. M. Thomas, M.D.

It is with very real pleasure that I bring to you, Mr. President, and members of the Philadelphia Neurological Society, on this your thirtieth anniversary, the greetings and congratulations from your friends and admirers in Baltimore and the South.

I am but too conscious how inadequately my feeble words can express the debt of gratitude that we nerve doctors, working to the south of you, owe to you, Dr. Mills, and to your associates in this society.

If I may indulge for a moment in reminiscence, I was a medical student when this society was organized, not even a doctor, certainly not a nerve doctor. I became interested, however, and I well remember my enthusiasm a few years later in studying Dr. Mills's map of the cortical areas. He was a veteran of a hundred engagements even then, and since has never left the firing line. No change has been made in the boundaries of these areas without his help or his trenchant criticism.

As for myself, I have since been mostly occupied in reading the reports of the members of this society, and that my labor has been recognized is shown in my being asked tonight to respond to the toast " Nerve Doctors and Other Doctors."

My subject does not call for much elaboration. Nerve doctors are just like other doctors, except that they are better doctors, wiser doctors, and handsomer men. They would also be the busiest doctors if the other doctors could only see the light and refer to them all their patients who could best be treated by nerve doctors.

Although I have little fear of contradiction, yet there may be some one here so mentally and physically blinded, who, after contemplating this assembly and listening to the speeches, might say in paraphrase of Mark Twain's stranger's remark about Smiley's jumping frog, Dan'l Webster, " Well, I don't see no

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pints about them doctors that's any better than any other doctors," and demand proofs of their vaunted excellences.

If such a one there be, I would remind him of our old friend, the German trombone player, whose assertion that he was the best trombone player in the whole United States, including Canada, was questioned. And I would say, as he said, with that confidence that can only come after a complete self-analysis, "Prove it? We don't have to prove it, we admit it."

There are nerve doctors and other doctors, and ordinary nerve doctors and nerve doctors Philadelphia style, and what a team you are! with Mills center, Dercum and Lloyd guards, Burr and Weisenburg tackles, Keen and Frazier at the ends, with Spiller giving the signals at quarter, and Jack Mitchell, Mc-Carthy and Allen in the back field, and the side lines crowded with eager, seasoned alternates.

The members of this team know every style of play, but prefer to score by straight, hard, legitimate neurology, thus perpetuating the illustrious examples of their early trainers, H. C. Wood, and the lamented S. Weir Mitchell. They are not unmindful of innovations, and have started many and adopted some, and have even been known to use the somewhat risky, delayed forward pass of Freudian psychoanalysis, although they take particular delight when on the defence in breaking this play up.

The team is, indeed, in the All-American class, difficult to score against, and quite impossible to keep from scoring. May it never be weaker!

Philadelphia is justly celebrated for other things as well as for nerve doctors—for its boundless hospitality above all. On this auspicious occasion the Philadelphia Neurological Society has, as ever, welcomed its guests, has taught us good neurology, and now tonight has fed us on the best there is in the land. You, members of the society, have every excuse for satisfaction, and we, your friends, rejoice with you. We, too, are satisfied, indeed, so satisfied that I find myself like the frog, Dan'l Webster, after his forced feeding, quite unable to jump. Therefore after these well-intentioned, although ineffectual heaves and croaks, I, certain of your ready assent, shall stop, hoping soon to join you in the dreamless sleep of satisfied desire.

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Since the formal organization of the society in 1884 the total list of members up to November, 1914, has been 249. Of this number 35 have died and 91 have resigned.

ACTIVE MEMBERS (1914)

Elected

1900 Allen, Dr. Alfred Reginald, 2013 Spruce Street.
1912 Anderson, Dr. Ella Mary, Philadelphia Hospital for the Insane.
1907 Bloomfield, Dr. Maximilian D., 2008 N. Park Avenue.
1884 Bochroch, Dr. Max H., 1539 Pine Street.
1914 Bond, Dr. Earl D., 4401 Market Street.
1897 Boyer, Dr. H. P., 4602 Baltimore Avenue.
1883 Brubaker, Dr. Albert P., 3426 Powelton Avenue.
1903 Buckley, Dr. A. C., Friends' Asylum, Frankford.
1911 Burns, Dr. Michael A., 900 N. 48th Street.
1888 Burr, Dr. Charles W., 1918 Spruce Street.
1911 Byrnes, Dr. C. M., 207 E. Preston Street, Baltimore, Md.
1907 Cadwalader, Dr. Williams B., 1710 Locust Street.
1904 Carncross, Dr. Horace, 1003 Spruce Street.
1914 Clark, Dr. William L., 1809 Chestnut Street.
1911 Copp, Dr. Owen, 4401 Market Street.
1905 Cornell, Dr. Walter S., 1725 N. 16th Street.
1886 DaCosta, Dr. J. Chalmers, 2045 Walnut Street.
1886 Daland, Dr. Judson, 317 S. 18th Street.
1902 Darlington, Dr. Horace H., Concordville, Pa.
1914 DeLong, Dr. Percy, Cynwyd, Pa.
1884 Dercum, Dr. Francis X., 1719 Walnut Street.
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1911 Drayton, Dr. William, Jr., 1316 Locust Street.
1914 Earley, Dr. Thomas B., Flanders Building.
1913 Easton, Dr. Flora Parker, State Hospital for the Insane, Norris-
       town, Pa.
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1910 Erney, Dr. Edwin H., 5602 Lansdowne Avenue.
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1885 Hare, Dr. Hobart A., 1801 Spruce Street.
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1907 Ingham, Dr. S. D., 1831 Chestnut Street.
1912 Jackson, Dr. J. Allen, Phila. Hosp. for the Insane, 34th and Pine Sts.
1914 Jones, Dr. Isaac H., 1831 Chestnut Street.
1889 Keen, Dr. W. W., 1729 Chestnut Street.
1911 Krumbhaar, Dr. Edward Bell, W. Mermaid Lane, Chestnut Hill.
1909 Lane, Dr. P. H., 186 Bethlehem Pike, Chestnut Hill.
1911 Langdon, Dr. H. Maxwell, 2018 Chestnut Street.

1914 Leavitt, Dr. F. H., 1519 Pine Street.
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1884 Mills, Dr. Charles K., 1909 Chestnut Street.
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1891 Mitchell, Dr. John K., 1730 Spruce Street.
1886 Morrison, Dr. William H., 8021 Frankford Avenue.
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1902 Weisenburg, Dr. Theodore H., 2030 Chestnut Street.
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1886 Wilson, Dr. James C., 1509 Walnut Street.
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1908 Davis, Dr. W. Price, Atlantic City.
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* Deceased.

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Original Articles

REPORT OF CASE OF PEMPHIGUS IN A PARETIC*

By MAX A. BAHR, M.D. AND FRED'K C. POTTER, M.D.

CENTRAL INDIANA HOSPITAL FOR THE INSANE

The case to be presented is of special interest from a differential point of view as to whether we are dealing with a case of simple, non-specific pemphigus occurring incidentally in a syphilitic, or whether the case is one of bullous syphilide of very late occurrence in an individual with an acquired syphilis, which is such an exceedingly rare condition that its existence is scarcely admitted by some authors.

From the onset of the disease in question, its symptomatology, course and termination, it has manifested some of the characteristics of either condition, although we are inclined to think the case one of pemphigus.

" Pemphigus," according to the definition of Stelwagon,[1] is " an acute or chronic bullous disease, characterized by the formation of scanty, irregularly scattered, variously sized, rounded or oval blebs, arising from apparently normal or moderately reddened skin, which may or may not be accompanied by mild or severe constitutional disturbances."

According to Crocker,[2] pemphigus is a comparatively rare disease, occurring once in 500 cases of skin diseases. Kaposi[3] of

* Read before the Indianapolis Medical Society, October 20, 1914.

Vienna, in his statistical studies of over 44,000 cases, gives one in 210; but he includes many bullous eruptions not classified under pemphigus by English and American writers. Stelwagon[4] reports four in 6,000 cases.

As to the causes of pemphigus, we are conspicuously ignorant. The disease has been observed in many cases in which marked changes in the central and peripheral nervous systems were noted: in fact, it is believed by many modern observers to be an active manifestation of a neurosis. In a case of pemphigus foliaceus, Schlesinger[5] found syringo-myelia to have been present. On the other hand, there is considerable evidence in favor of the view that it is due to a special microörganism. The action of toxins of various sources on nerve structure appears to explain best the phenomena of the disease.

Numerous so-called varieties of this rare and as yet obscure disease have been described, based chiefly upon the duration, age of the patient, and the clinical character and behavior of the eruption. The division in many respects is purely arbitrary. The varying grades of the lesion which have somewhat complicated the nomenclature are mainly differences of degree, rather than of type. The whole subject of pemphigus is, in fact, at present chaotic, and it is at times even puzzling to the trained dermatologist to know just what to include under this head.

Four varieties of this disease are generally recognized: (1) pemphigus vulgaris, which may be acute or chronic and usually terminates fatally; (2) pemphigus foliaceus, a malignant form, in which the bullæ are purulent from the start, rapidly increase, do not heal, and are replaced by lamellæ, or scales; (3) pemphigus vegetans, an exceedingly rare type, and (4) pemphigus neonatorum, an acute infectious form observed in infants soon after birth.

Pemphigus vulgaris is generally characterized by the appearance of a few discrete bullæ about the face, which gradually invade the entire body, but especially the trunk and upper extremities. The bullæ contain a serous fluid, which in many cases, soon becomes purulent and at times hemorrhagic. Itching and burning are experienced, accompanied by slight prostration, anorexia, and, occasionally, slight fever. The disease remains stationary some weeks, and then suddenly assumes a state of exacerbation, during which more bullæ are developed or the older ones greatly

increase in size and become confluent. Successive attacks occur, weeks or months apart, each being attended by sharper manifestations, local and general. The oral cavities, the eyes, the genitalia, and the respiratory and gastro-intestinal tracts are gradually invaded, and the patient sinks into a cachectic condition from which he does not rally. This constitutes what is often termed the chronic, or slow, form. In the acute form, the symptoms outlined merely occur in closer succession and are more grave from the start; chills, high fever, delirium, etc., follow in rapid succession. The eruption, consisting of round or oval, slightly elevated blebs containing clear fluid, is usually limited to the upper part of the body and is discrete. Death occurs in from ten days to two weeks after the onset. It greatly resembles a contagious form, which, however, is much more rare.

In pemphigus foliaceus, the bullæ may develop as in the preceding variety, but they are apt to be flattened. They contain a small quantity of foul-smelling liquid or pus and rupture easily. Other bullæ form around the older ones, and the entire surface of the body becomes covered; the underlying skin, failing to heal, presents a raw and red appearance, recalling a superficial burn. Oval or round scales or leaf-like crusts (whence the name) are formed over the older bullæ, and the skin itself appears scaly, retracted, creased, and ulcerated in various spots. Painful itching and smarting, followed by various complications, *e. g.*, enteritis, pulmonary congestion, etc., give rise to considerable suffering, and the patient gradually becomes weaker, and death results from one of these intercurrent disorders.

Pemphigus vegetans is distinguished by the presence of papillary outgrowths proceeding from the ruptured bullæ. This type is so rare that but very few cases have ever been reported.

Pemphigus neonatorum, or epidemic pemphigus, is seldom, if ever, present at birth, does not develop before the third day, and rarely later than the fourteenth. The eruption, unless complications occur, is not accompanied by fever, and consists of round or oval blisters upon apparently normal skin.

Autopsy reports in fatal cases of pemphigus show this bullous eruption in association with diseases of the brain, medulla, cord, ganglia, the peripheral nerves, the liver and kidneys. According to Duhring,[6] the disease usually involves other tissues than the skin, but we have been unable to find a description of changes

in any other organs which were characteristic of the disease.
Since there is no consensus of opinion, by competent observers,
of what constitutes a true pemphigus, we can hardly expect to
find any typical anatomico-pathological picture. The bleb may or
may not have an inflammatory base and the pathological picture
varies accordingly. As a rule, the horny layer of the skin forms
the roof of the bleb, with the mucous layer forming its base or
being partly disintegrated by it. The blood vessels are dilated, the
corium is edematous and invaded with leucocytes.

Demme,[7] Daehnhardt[8] and Whipham[9] succeeded in cultivat-
ing a diplococcus, pathogenic for guinea pigs, from the serum of
the blebs of both acute and chronic pemphigus. Von Babes[10] has
described staphylococci and a peculiar streptococcus grown from
the serum of these blebs.

Schwimmer[11] describes changes in the spinal cord in five cases,
while Petrini found no alterations in three cases, and Kaposi[3] in
nine consecutive cases found histopathological changes in but one,
and did not consider them characteristic. Petrini,[12] Mott[13] and
others have reported cases in which atrophy of the peripheral
cutaneous nerves was present.

Many of the older observers believed pemphigus neonatorum
to be the same disease as bullous impetigo contagiosa. Cole and
Ruh of Cleveland, in the Journal of the American Medical Asso-
ciation, October 3, 1914, report an epidemic of nine cases and give
a very comprehensive review of the literature of this form of
pemphigus. It is interesting to note in connection with our case,
that in all their cases where unruptured vesicles were to be found,
they succeeded in obtaining a pure culture of Staphylococcus
aureus.

The patient to be presented was in the service of Dr. P. J.
Watters, to whom we are indebted for the following history and
personal observations of the case:

P. G. W., age 51 yrs., married, painter by occupation, was ad-
mitted to Central Indiana Hospital, April 27, 1914.

Family History.—Obtained from wife; Father was born in
Germany. He served in our Civil War. He had had chronic
diarrhea and died of rheumatism. Mother died of tuberculosis.
History is otherwise negative excepting that one brother also died
of tuberculosis. Parents were industrious and fairly intelligent.

Personal History.—Patient is a native of Ohio. As a child
was always considered healthy. He was always good natured

and kindly disposed to everyone, and acted as a father to five brothers and one sister. Attended public school until twelve years of age and then went to night school until his fourteenth year. His first employment was in a chair factory as a painter, at the age of fourteen years. Was confirmed in the Lutheran church at the age of fifteen and attended church regularly for several years, but of late became careless. At the age of thirty-one, was kicked in the chest by a horse and confined to bed for one or two weeks. Had two attacks of appendicitis, but was never operated upon. At one time become overheated while working in a closed room.

There is no history of alcoholism. Had one attack of lead poisoning.

At the age of twenty, he contracted a sore in his mouth, after kissing a girl, whom his companions told him later had syphilis. The lesion developed about four weeks after contact and was very hard and firm in character and not especially painful. He was treated by a physician who cauterized the sore three or four times at intervals of three to seven days. Patient states positively that he never noticed a rash on his body or any other consequences from his sore.

Married at the age of twenty, and has had no children.

Development of the present psychosis dates from November, 1913, when the patient expressed the idea that he wanted to build a much larger house than he could afford. In December of the same year, he had a nervous breakdown and took treatment for neurasthenia during January and February, 1914. In April, 1914, his first real mental defect was observed when he took a lawn mower apart and could not replace the parts, and the same evening left his home and did not return that night. When he did return, he removed the door locks that he might make a set of keys. It was difficult to hide knives, razors, etc., from him, as he was continually searching about the house for such articles. He quit his work because he became immensely wealthy and was continually going to build a number of houses. He would easily become angered and was very irritable.

In December of 1913, he began to lose weight and at the time of his admission, he was poorly nourished.

Examination on Admission.—Patient was 5 ft. 9 inches in height, weight, 140 lbs. Cheerful expression. The anterior borders of both tibiæ were slightly roughened. The eyes were gray, the pupils were small and reacted to light and accommodation well, but not normally. Conjunctivæ were pale and corneæ clear. The teeth were poor. The mucous membrane of the mouth was pale; palate high arched. Examination of lungs, heart and abdomen was negative, except for an accentuation and slight roughening of the second aortic sound. The superficial and deep reflexes were active and equal. No Romberg, ankle clonus
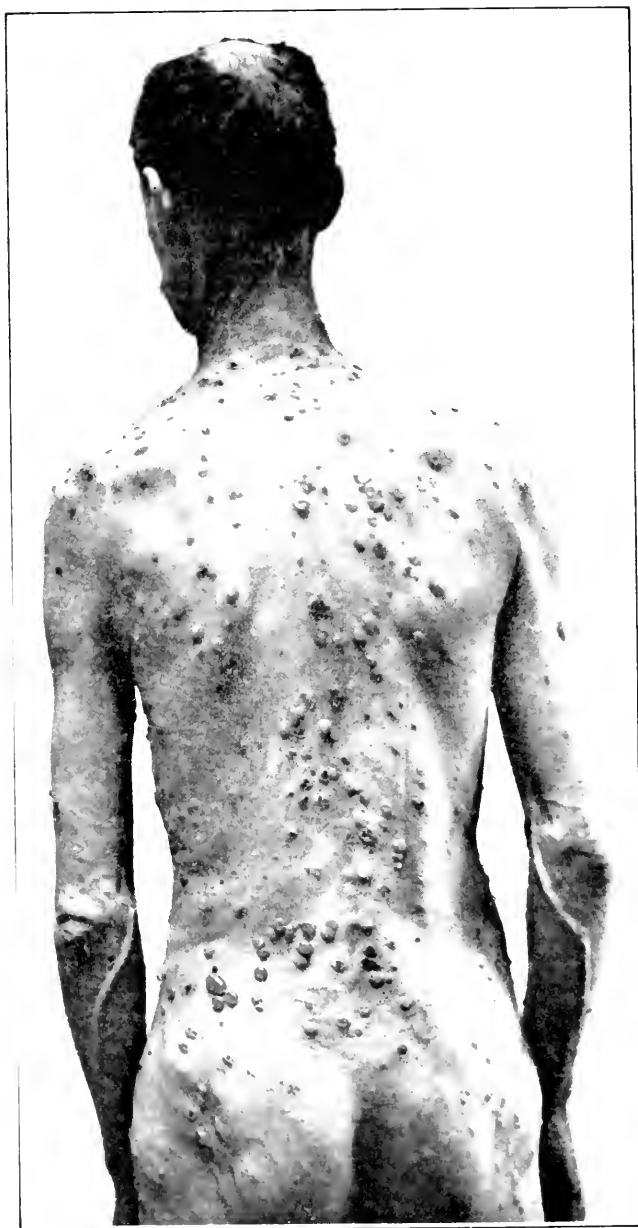
FIG. 1. Numerous Bullæ Noted Projecting Prominently Above the Normal Skin, Forming an Oval or Rounded Tense-walled Bleb. The Fluid Contained Therein was at First Perfectly Clear and Gave a Positive Wassermann Reaction.

or Babinski. The axillary and inguinal glands were slightly palpable. Patient was vaccinated April 27, 1914. Blood serum and spinal fluid both gave a strongly positive Wassermann reaction. The spinal fluid in addition gave strongly positive reactions for globulin and a pleocytosis.

The history of the skin lesion in which we are especially interested at this time is as follows:

On June 2, 1914, after scrubbing the back with soap and water, followed by alcohol and tincture of iodin, a lumbar puncture was done, and on the following morning at 10 A.M., a single bleb 5 inches above and 2 inches to the left of the point punctured, was noted (see Fig. 1). No headache or nausea was present. On the following day, June 3, a half dozen blebs on the back, eight on the scalp and a similar number on the upper part of the chest and in the axilla were observed. These blebs presented a circular base and were filled with clear, pale yellow fluid, which escaped on puncture. The skin including the margin of the bleb, was whitish in color. Temperature at this time was $99\frac{1}{2}°$ F.

On June 5, these blebs increased in number over the chest and back, with a few on the abdomen and upper half of each thigh. Temperature, $99\frac{1}{2}°$ (see Fig. 2).

June 6, a new series of blebs appeared between those of June 3 and 5, and a new series each day until June 12. These increased in number on the thighs and a few appeared on the upper part of the legs.

June 10, several blebs were present on the mucous membrane covering the hard palate and the floor of the mouth. There was pus along the edge of a few of the blebs that had been irritated. On the scalp there were two dark red spots $\frac{3}{8}$ in. in diameter that had been scratched. Temperature, $99\frac{1}{2}°$. Wassermann reaction with fluid from clear blebs was four plus. Culture of fluid from unruptured, clear blebs gave a pure growth of Staphylococcus aureus. Blood examination showed 85 per cent. hemoglobin; 3,830,000 erythrocytes; 8,400 leucocytes and a differential count of 62 per cent. polynuclears; 15 per cent. large lymphocytes; 11 per cent. small lymphocytes; 4 per cent. transitional forms; 5 per cent. eosinophiles; and 3 per cent. basophiles.

On June 13, examination of blood gave a leucocyte count of 10,200, the differential count being nearly the same as that on June 10.

June 15, in the axilla and on the chest and back, the blebs became confluent. Temperature, $99°$ (see Fig. 3).

The palms of the hands and the soles of the feet were not involved at any time.

June 20, the spots became lighter in color and gradually faded in the order of their appearance.

June 30, cherry red spots of the first and second series faded.

Fig. 2. Showing Extensiveness of Eruption Over Chest, Neck, Face and Scalp.

FIG. 3. Coalescence of Neighboring Bullæ in the Region of the Left Axilla from which a Superficial Excoriation Ensued. When Healed it Formed a Large Scab.

Fig. 4. Resulting Pigmentation After Disappearance of Eruption.

leaving a smooth, dull red surface, most noticeable on the scalp. Temperature, 99°.

July 4, discoloration fading slowly.

July 10, developed a carbuncle over the left gluteal region.

August 11, all the blebs have disappeared and nothing remains except the pigmentation, which since has been gradually fading (see Fig. 4).

The patient was given a prescription of iron, quinine, strychnine and arsenic. The body was painted twice daily with zinc oxide and menthol in olive oil.

Differential Diagnosis.—In the bullous variety of dermatitis herpetiformis, the blebs usually appear in groups of two or three, are often pustular from the beginning and more flat than in pemphigus. The skin around and between the bullae is reddish and puckered. In our case, the blebs were round, appeared in successive crops and only became pustular several days after eruption

Bullous lesions are seen in association with neuritis, but here as in herpes zoster, the blebs are found over the distribution of certain nerves. In syringomyelia, bullae may appear but are always associated with disturbance of sensibility for heat and cold. There was no distribution over the course of any nerves, nor any disturbance of sensation in our case.

Bullous syphiloderm is a very rare disease in adults and in acquired syphilis. It nearly always involves the plantar and palmar surfaces, which parts are very rarely, or never, involved in pemphigus. You will recall these areas were not involved in our case. The blebs have a dusky red areola and are usually pustular from the beginning. The bleb ruptured or unruptured is soon covered with a brownish-red or greenish-black crust. The underlying surface is eroded or ulcerated, and usually secretes a greenish-yellow fluid. The healed areas appear as deeply pigmented scars. In pemphigus, the bullae become pustular some time after eruption. The surface after rupture is red but not eroded or ulcerated. The healed lesions appear as more or less pigmented areas which fade slowly.

What was the relation of the eruption to the lumbar puncture or the preparation for it? Had the membranes of the cord been infected, a meningitis would have followed. The first bleb appeared within the area scrubbed with soap and water, and it may have been the result of an infection of the skin at this point, due to the known low resisting power of the skin in cases of paresis.

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EXPERIMENTAL SUBARACHNOID INJECTIONS OF TRYPAN BLUE

By William Cavan Woolsey, M.D.

LABORATORY OF SURGICAL PATHOLOGY, COLLEGE OF PHYSICIANS AND SURGEONS,
NEW YORK

In considering the recently adopted subarachnoid administration of salvarsan as a therapeutic measure in the intensive treatment of luetic lesions of the central nervous system the following question among many others arises.

To what extent does salvarsan injected into the subarachnoid space reach the central nerve tissue with greater certainty and intensity than when administered intravascularly or subcutaneously?

The successful work of Professor Edwin Goldmann (Vitalfärbung am Zentralnervensystem) with trypan blue as a vital stain for the central nerve tissues suggested a way to answer our question.

The benzidine dye trypan blue differs from other vital stains such as isamin blue, in having the same chemotactic affinity for tissue as salvarsan and has therefore been selected as an indicator of the tissues with which the salvarsan injected subarachnoidally may unite.

After lumbar subarachnoid injections of various doses of a saline solution of the dye macroscopic and microscopic examinations of the central nerve tissues were made.

As a preliminary report covering observations made on twenty-six successful experiments with cats, dogs and rabbits the following findings are offered.

TECHNIQUE

Repeated subcutaneous injections of from 3 to 5 c.c of 2 per cent. saline solution of trypan blue.

Single intraarterial and intravenous injections of 10 to 20 c.c of trypan blue solution.

Single lumbar subarachnoid injections of varying doses of try-

pan blue from $\frac{1}{2}$ c.c. of 0.1 per cent. solution in rabbits to 10 c.c. of 2 per cent. solution in large dogs.

The uniformly fatal and serious results reported by Goldmann following lumbar subarachnoid injections of trypan blue were not observed by the writer.

The few serious or fatal effects of intraspinal injections that did occur seemed to depend not upon the toxicity of the dye as used but upon the volume of the injection mass, the rapidity of its administration and the amount of spinal fluid that could be withdrawn prior to injection: In other words upon any factor of the technic which materially raised intraspinal pressure.

No anesthetic was administered, which in Goldmann's animals must have masked the reported central nerve symptoms, and when the dose of the injection mass was kept below a definite lethal quantity, 1 c.c. of a 0.1 per cent. solution in rabbits, no convulsions occurred or if they did appear in some animals, the immediate withdrawal of a small part of the dose allowed recovery in a few hours.

The difficulty of entering the lumbar sac with a fine needle in rabbits and cats rendered many experiments unsuccessful and necessitated special study of the anatomical conformation of their vertebræ. No laminectomies were necessary and only those animals are considered where subsequent autopsy showed a proper placement of the injection mass.

The spinal fluid of the rabbit and cat is so scant that only occasionally could a drop or so be obtained to identify the location of the needle point.

When the dosage of the injection was raised forcibly beyond that point which seemed to be sublethal for the animal, suddenly with very apparent release of intraspinal pressure, the animal became convulsive and simultaneously a deep blue color appeared in the eyes. This coloring of the eyes was a reflected blue not one of general conjunctival diffusion but of retinal infiltration as if the dye had burst its way from the spinal subarachnoid space into the cisterna subarachnoideæ and from there into the optic nerve sheath.

Repeated subcutaneous injections of varying doses of trypan blue continued over a period of several days and resulting in an intense intravitam stain for all other tissues of the body, failed to reach the central nervous system except in exceedingly small

quantities observeable macroscopically as a very faint sky blue in the cranial dura and the ventricular veins.

Intraarterial injections of sublethal doses of a 2 per cent. trypan blue solution were made into the carotid artery, the animal allowed to live for forty-eight hours and then killed. At autopsy the generalized blue color was marked. In contrast was the notable creamy whiteness of the unstained central nerve tissues with only slight tinting of the cranial dura and ventricular plexuses.

Intravenous injections of sublethal doses of a two per cent. trypan blue solution, given into the jugular vein, resulted always in a generalized tissue stain exclusive of the central nervous system.

Fifteen successful lumbar subarachnoid injections were given in rabbits, cats and dogs, the latter animals offering by far the most satisfactory experimental material inasmuch as their vertebral column allows puncture with greater ease, the prompt appearance of spinal fluid assures the experimenter of the proper position of the needle and withdrawal of the desired quantity of fluid makes room for the injection mass without increasing intraspinal pressure. As much as 10 c.c. of a 1 per cent. solution of trypan blue was injected into the lumbar sac of a large dog without fatal results. In rabbits ½ c.c. of 1 per cent. solution seemed the sublethal maximum. In cats 1 c.c.

We shall first consider the macroscopic and miscroscopic findings in those animals where a sublethal dose was successfully administered. The uniformity of findings in all species of animals used, renders a detailed account of each superfluous.

Macroscopic.—The meninges of the cord were stained a deep blue up to the level of the cervical enlargement, from which point, by gradual gradations, the intensity of the color diminished to the foramen magnum. Above this level the color of the cranial meninges though a distinct deep blue in places, showed many areas where the color was hardly more intense than in the intravascular administration.

The periphery of the cord itself just under the pia was stained a distinct blue for a distance of ½ to 1 mm. below the surface. No such invasion of the brain above the medulla could be distinguished.

MICROSCOPICALLY

Frozen and paraffin sections were made of eight to twenty microns in thickness from various levels of the cord and parts of the brain.

Cord.—The dura and arachnoid of the cord were stained intensely blue. The fine trabeculæ bridging the subarachnoid space were beautifully demonstrated. The pia was similarly stained and its fine trabeculæ extending from the surface into the white substance of the cord were distinctly though faintly blue. Here and there immediately next the pia were seen stained blue cells that presented all the morphological characteristics of true nerve cells but their comparative infrequency precluded proper cytological study and recognition. The ependyma of the cord showed faintly but positively blue.

Brain.—Though the cranial meninges showed macroscopical staining it was not sufficiently intense to permit of recognition in frozen or paraffin sections.

CASES IN WHICH A LETHAL DOSE HAD BEEN ADMINISTERED

We believe the findings in these animals, though fatally overdosed, are of experimental value because they demonstrate which tissues of the central nervous system can be reached from a thoroughly permeated subarachnoid space even though it cause the death of the animal to thus permeate this space in *one injection.*

MACROSCOPICALLY

Cord.—Macroscopically the picture of the cord is the same as in sublethal doses, except for its greater intensity of stain. Instead of the previously described lessening of color at the cervical enlargement and patchy invasion of the cranial meninges the whole central system presents an intense blue color. Section at any level of the cord shows general permeation of the cord substance with blue and in the brain an invasion of its gray or white substance several mms. below the surface.

MICROSCOPIC

In addition to the microscopic picture described as occuring with sublethal doses the pial trabeculæ are more distinctly infil-

trated with the dye and throughout the cord and brain substance is seen a fine trabeculated network with here and there a nucleus. This network of cobweblike fibrils corresponds morphologically to the neuroglial framework of nerve tissue and indicates a well-marked general distribution of the dye particularly to the connective tissue elements of the brain and cord.

In the cerebellum, cerebrum and midbrain the stained neuroglial network may be seen for varying distances below the pia. In this reticulated tissue here and there are seen the nerve cells that stained only sparsely with sublethal doses.

In these observations no attempt has been made to limit our report to those tissues which united with the dye in a true intra vitam manner, viz., without causing death or degeneration of the cell, for the sublethal administrations were true intra vitam stains and gave evidence as to the particular tissues stained, whereas the lethally experimented animals served to identify the paths through which the dissemination takes place when either large or repeated dosage may be employed.

Summary

These experimental observations seem to indicate that salvarsan administered subarachnoidally does reach the central nerve tissues more certainly and with greater intensity than when given intravascularly or subcutaneously.

That when administered intraspinally its diffusion to the cranial cavity is less intense than in the cord and that perhaps for intracranial lesions direct injection into the cranial subarachnoid space through a trephine opening would be less dangerous and more effectual.

MENTAL DISEASE AND LANGUAGE

By Wm. McDonald, Jr., A.M., M.D.

INTRODUCTION

Whether or not monkeys and apes speak in words it may be safely accepted as true that these animals possess no highly developed verbal language. Speech belongs peculiarly to the human being. And when comparison is made between the limited vocabularies of aboriginal tribes and the rich word variety of modern civilization, it is also evident that the development of mind and that of language go hand in hand. It is a far cry from the clicking language of the Hottentot to the modern 300,000 word dictionary. Since the sixteenth century the enriching of the vocabulary is said to be the most distinctive feature of development of the English language. In the development of trade sailors and merchants have borrowed words from every language in the world, while science with its application to the useful arts has introduced many new terms.

Individual mental development also goes hand in hand with the acquirement of langauge. From the nonsense prattle of the infant to the flexible power of adult expression one may trace the gain in knowledge and the growth of mind.

In general the vocabulary increases with education, and someone has estimated that the average uneducated person has only about 800 words at command; while the ordinary educated man uses in daily intercourse about 2,500 words. Milton used 7,000 different words in his poetical works and Shakespeare about 25,000.

The study of language as applied to the building up of mind in various aspects has been carried out with scientific spirit; and students of psychology, pedagogy, history, ethnology and literature have each in their own way investigated language, and have thus advanced our knowledge of the way in which mind grows and works.

Is it not remarkable, on the other hand, that so little attention has been paid to language as an index of mental deterioration and

disorder, and as a means to a more exact understanding of the way in which mind becomes erratic or degenerates? It is the more surprising that so accessible a means of study has been neglected, since the student of mental diseases has alway complained at the lack of the more tangible, visible and audible evidences of disease, such as the physical signs which lighten the task of the diagnostician in general medicine.

Inaccessibility, however, affords no excuse for ignorance when we have yet failed to avail ourselves of the means already at hand to join yet a little corner to the reclaimed fields. So often do we hear the complaint, " To acquire a knowledge of mental disease is difficult and slow, because the patient's mind remains hidden from us except as it happens to find expression in his behavior." We are told that we may observe and interpret, construe and predicate, and that we may thus arrive at a certain number of conclusions which may be accepted as probably true, but that the inner workings of the patient's mind must remain largely hidden by the veil of his reticence, apathy, inactivity and silence. True; but a moment's consideration will show that we have not yet availed ourselves of more than a fraction of such information as may be obtained for the effort.

Neglecting for the time the vast field of general bodily activity, of behavior, as an expression of mental function, let us confine ourselves to that type of expression to be found in verbal speech. Here we have one of our " physical signs " of mental disease.

To be sure, much has been already done in the direction of identifying disturbances of speech and correlating them with different diseases of mind and body of which they have been found to be characteristic.

The purely vocal defects due to disturbance of function in the peripheral nerves controlling the larynx, pharynx, palate, lips and tongue have long been recognized, and the significance of aphonia, thickness, huskiness, nasal tone, etc., has been determined.

The reflex sensory-motor disorders in the speech act, such as tremor, explosiveness, incoördination, scanning, stammering and stuttering have achieved diagnostic importance.

Disturbances of higher functions, conscious and unconscious, voluntary and involuntary, have received attention, and the studies of Kraepelin and others as to the meaning of retardation, acceleration, logorrhea, mutism, loudness, quietness, monotony, flight,

desultoriness, circumstantiality, incoherence, irrelevancy, verbigeration, echolalia, suggestibility, etc., have gone far toward establishing those nice distinctions and correlations which lead to correct diagnosis.

The association tests so widely employed of late, represent a fresh effort to gain information through the patient's verbal expressions. In the vocabulary, however, (the word-treasure, as the Germans put it) its composition as to proportions of the different parts of speech, its extent, its flexibility, the changes which it undergoes under altered conditions of emotion, attention and volition, its alteration by disease, is a field of research which seems to have been almost entirely overlooked.

The only apparent explanation for the neglect of studies in vocabularies lies in the fact that a considerable degree of tedious mechanical tabulation and a patient pertinacity must pay for the results obtained. But when once the way has been found, statistics compiled and laws established, the work will have been made easier for those who follow.

Long ago certain superficial changes in vocabulary were recognized as characteristic of mental disorder. Everyone knows that old persons have difficulty in recalling names—not only proper names, but the names of ordinary objects. Not only does the old man fail to retain new impressions, but he is constantly at a loss to recollect the names of things which he has known and easily recalled all his life.

But what other changes are brought about in the vocabulary of senility no one has taken the trouble to determine, notwithstanding the intimate relationship between the mental processes and their expressions in speech. It is well known that the variability of the words, the amount of speech, the spontaneity, the length of sentence, the grammatical construction, and even the choice of words used are all affected in a characteristic way by the different diseases. Thus, the stereotypy and verbigeration of dementia praecox, the repetitions of depressive and exalted states, the abnormal effect of sensory impressions upon the mobile attention of the manic patient illustrate to what extent our classifications have been influenced by the study of verbal expressions. But no one has attempted to fix definite limits to the variability of language in different psychoses, nor to determine whether or not there be characteristic limitations in the control of the use of words. If it

be true that the percentage of usage of verbs or nouns changes constantly in a definite way as the child acquires the use of language and as the uneducated man becomes cultured, why is it not reasonable to suppose that disease and disorder may be revealed in changes of a like nature? If there be a reversion to a childish type of thought in disease, why may we not recognize that deterioration in the type of sentence formation and choice of words? Diminution or intensification of feeling may perhaps be exhibited in decrease or increase in the number of adjectives. Apathy may appear in alteration in the number of conjunctions. Abulia might be discovered in the variety and number of verbs. Certainly the degree of variability in vocabulary must be altered in states of mental obstruction.

We could continue to suggest innumerable changes in vocabulary which might be found to exist in different mental states, but there is little room for argument until an attempt has been made to determine these points by actual analysis.

In aphasia studies, to be sure, a nearer approach has been made toward systematic investigations, but until recently effort has been directed chiefly toward the establishment of a highly artificial nomenclature having little basis in fact, either psychiatric or physiologic.

Energy has been wasted in wrangles over terms when close clinical study would have destroyed the differences in opinion. To determine whether an aphasia is cortical or subcortical, sensory or motor, of Broca or Wernicke, is not nearly so important at present as is the exact clinical description of the defect.

When a man cannot give the name of an object and a reasonable attempt has been made to determine whether his trouble lies in his vision, his hearing, his touch, his recognition, his word memory or his sensori-motor speaking functions, let us lose no time in attempting to marshal the case on the side of Dejerine or Marie, but first seek to discover to what extent his vocabulary is limited as to other nouns, as to verbs, prepositions and other parts of speech.

The first real effort in this direction that has been made is of very recent date and marks a distinct advance in methods of study. Thus, it may be noted in several of the latest reported examinations of aphasias that the investigator has not been content with the usual question; as, " Name this or that object," etc., but

has entered actively into the study of the patient's concepts as represented by parts of speech other than simple substantives or verbs. Thus the patient's understanding and control of words representing adverbial and spatial relations, particularly prepositions, has been tested by series of questions and commands; as, "Is the book *on, under, in* or *over* the table?" "Place the book *in, on,* etc." Likewise in one examination at least, I have noted an attempt to measure the patient's notion as to the passive and active moods and his differentiation of tenses in the use of verbs.

The information gained from such beginnings is of such interest that investigators will soon find themselves pushing far into new fields, and psychiatry is bound soon to be enriched by these new discoveries.

I

The Normal Vocabulary

The present studies represent an attempt to summarize the results of certain comparative investigations concerning the vocabularies of the normal child, of the normal adult, and of persons with mental disease. Throughout a number of years the work had been pursued from pure interest in the subject and pleasure in the research involved. This method of presentation has been chosen since it seemed to offer an opportunity of making some disposition of the accumulated material and in a sense an excuse for the compilation of the data at hand.

Some knowledge of the average constitution and range of the normal vocabulary must, of course, be acquired if we are to recognize abnormality in the use of words.

Much has been done by students of psychology, pedagogy and philology to determine the mode of development of language in the normal child, and there exists a satisfactory amount of literature concerning the actual make-up of the vocabulary at different ages. Baby books in which mothers make daily note of the progress of their young hopefuls and the modern fad of psychologizing the youngsters have really been of great service in establishing data concerning mental growth. But interest seems to have ceased largely after the children's fifth year, and, unless I have been unfortunate in search for references, there is a sad dearth of established facts relating to the normal adult vocabulary. Much has been written on the subject, but, for the most part, the observations have been superficial and the conclusions untrustworthy.

As an illustration of this carelessness in making statements relative to the proper and improper percentage of usage of the various parts of speech, an editorial in the literary section of the *New York Times* of March 14, 1908, may be quoted.

The editor writes of the use of " The Adjective." He suggests economy in the use of adjectives. Three consecutive sentences selected at random from his own well-written article contain 7 adjectives in 47 words, a percentage of 14 + ; whereas, the average normal usage is about 12.38 per cent. and the usage of adjectives by Nathaniel Hawthorne in 1,500 words was found to be 12.96 per cent.

Analyzing 5,000 words taken down stenographically from ten normal adults, I found that 619 adjectives were used, the man of highest culture using 82 in 500 words, the woman of lowest culture using 44.

The editor in the above mentioned article concludes with the following declaration, " Words of power . . . have their place and use. The adjective is not, however, the word of power. . . . Examine the words of the writers who move you: you will find they write in words of motion—in verbs."

Following his advice I have examined the work of writers who have moved me, and in addition have counted the parts of speech in over 50,000 words spoken by 100 persons normal and abnormal. Ignoring, for the present, the children and the abnormal subjects, it may be stated that in the 5,000 words of normal persons there were 1,088 nouns and 978 verbs. But three persons, the lowest from standpoint of culture, used more verbs than nouns. Hawthorne in 1,500 words from three different selections uses 24.2 per cent. nouns and 16.32 per cent. verbs, as against 21.76 per cent. nouns and 19.56 per cent. verbs, used by ten persons, most of whom are not noted for literary ability.

Another example of ill-advised statements is that concerning the range of vocabulary of rough and untutored persons. One is familiar with the declaration that the ordinary seaman uses ordinarily but 150 different words and that British working-men of a certain class have a range of but 300. The absurdity of such estimates is apparent when one takes the trouble to actually count the words.

Thus, the average range of ten normal persons using each 500 consecutive words was found to be 226.9, a very small part, of

course, of the total vocabulary which any one of those persons had at command or would use in the course of a day. Even very young children have a far greater command of language than that attributed to the much abused laborer. A little girl of my acquaintance, 3 years and 2 months old, used 149 different words in 500; an adult imbecile used 210 in 500. M. C. and H. Gale found that children of but 2½ years used from 600 to 800 different words in a single day, and that their total vocabulary consisted of between 1,300 and 1,432 different words by actual count.

The only way, therefore, to determine the characteristics of the normal vocabulary is to actually catalogue and count the words spoken by various persons. This I have attempted to do by the following method.

Ten persons were selected from different walks of life and with different grades of learning, all being of normal intellectual capacity, but chosen in such a way that a series should be formed having at one end a scholar of the highest type, renowned for his command of language, and at the other end a woman of limited education, of the grade of a domestic servant. A stenographer of several years experience, carefully trained under personal supervision and especially expert in recording exactly the verbal expressions of persons under observation, noted the every word of the subject.

In order that the results might be reasonably comparable the subjects, both normal and abnormal, were requested to relate their personal histories from birth. But once launched on their narrative they were permitted to speak uninterruptedly, questions being asked only when the flow of language ceased to come readily, the effort being to preserve spontaneity and originality so far as possible. 500 words were thus procured from every subject (except from certain cases of organic brain disease where the vocabulary was extremely limited, or where the patient was unable to speak at all).

From normal persons the following data were obtained. **The** highest degree of variation was 262 different words in 500, *i. e.*, 52.4 per cent.; the lowest 198 in 500 (39.6 per cent.). The average variation was 226.9 (45.38 per cent.).

The proportion of different parts of speech was as follows:

Nouns

Largest no. used by any person in 500 words was 138 (27.6 per cent.)
Smallest no. used by any person in 500 words was 76 (15.2 per cent.)
Average no. used by any person in 500 words was 108.8 (21.76 per cent.)

Verbs

Largest no. used by any person in 500 words was 135 (27 per cent.)
Smallest no. used by any person in 500 words was 65 (13 per cent.)
Average no. used by any person in 500 words was 97.8 (19.5 per cent.)

In the same way the highest, lowest and average number of the different parts of speech was determined. Then the number of *different words* of each part of speech was counted, and finally the percentage of variation proportional to the frequency of usage was estimated for each part of speech.

Rehearsal of all this array of statistics—though they are of value as a basis for comparison with the vocabularies of children and abnormal persons—would be exceedingly wearisome, and can well be omitted from this paper.

Briefly summarized, there were used in 5,000 words

Nouns 1,088
Verbs 978
Pronouns 700
Adjectives 619
Prepositions 562
Adverbs 478
Articles 318
Conjunctions 229
Interjections 28
                                                   5,000

In regard to variety of words in each part of speech, the nouns are far in the lead (average 73.1 *different* nouns per 500 words of each person), followed by verbs, adjectives, adverbs, pronouns, prepositions, conjunctions, interjections and articles in the order named.

A large number of interesting details were gathered from the analyses of normal adult vocabularies, but, in order to avoid repetition, reference to these will be for the most part omitted until we come to a comparative study of the vocabularies of children and of abnormal persons. A few, however, may be mentioned because of their bearing upon purely normal, individual variations in vocabulary formation.

Thus, it was found, for example, that, in general, persons of highest culture used a larger proportion of nouns than did those

less educated, and that the number of nouns varies directly with the grade of culture.

The variety of *nouns* is as a rule directly proportionate to the total number used.

The least cultured use the greatest number of *verbs* and vice versa.

The use of *nouns* is in almost exact inverse ratio to the use of *verbs,* the two parts of speech together supplying about two thirds of the total vocabulary for each person.

The words *is* and *was* compose 3 per cent. of the whole vocabulary, being used 150 times in 5,000 words.

The frequency of the use of *adjectives* and *prepositions* bears a constant relation to the use of *nouns,* and the same is true to a lesser degree of the articles.

The definite *article* was used 187 times, *a* 111 times, *an* 19 times. All persons but one used all three articles.

Pronouns are used in almost exact inverse ratio with the nouns, the two parts of speech combined numbering in every case between the narrow limits of 174 and 187.

Adverbs are used in greater numbers by the uncultured and in inverse ratio with nouns, prepositions, adjectives and articles, but in direct ratio with verbs and pronouns.

The particular words most used of each part of speech were:

```
Pronouns ...............................I
Article   ...............................the
Preposition  ...........................of
Conjunction   ..........................and
Verb  ..................................was
Noun  ..................................year(s)
Adverb  ................................very
Adjective  .............................old
Interjection  ..........................well
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The degree of variety of words in proportion to the number used in a particular part of speech was greatest in the interjections and smallest, of course, in the articles. The other parts of speech arrange themselves in the following order according to the proportional variation.

1. Interjections.
2. Adjectives.
3. Nouns.
4. Adverbs.

5. Verbs.
6. Conjunctions.
7. Pronouns.
8. Articles.

The most striking feature of the analyses is the unmistakable separation of the subjects into two distinct groups: one is composed of those in whose speech nouns, adjectives, prepositions and articles predominate, the other of those who express themselves more by the use of pronouns, verbs, adverbs and interjections. Personal idiosyncrasy—regardless of the degree of culture—may perhaps be found by analysis of a greater number of cases to be responsible for this difference in mode of speech, but it is extremely significant that in our own studies the cultured were found all in the noun-adjective-preposition group and those of lesser culture in the verb-adverb-pronoun class. Evidence of the influence of culture in determining this division is all the more convincing when we find that the most renowned scholar is at the top of the first group and the most unlearned person at the bottom of the second. Moreover, our study of masters of diction has found them invariably in the first group.

The extent to which the two groups may be separated is shown by a glance at the figures. In 500 consecutive words of the scholar there are 353 nouns, adjectives, prepositions and articles, and but 147 verbs, adverbs, pronouns, interjections and conjunctions, while the illiterate person used 162 of the *noun-adjective* group and 338 of the *verb-adverb* class.

Between the two divisions are two persons of mediocre culture who use about 250 words of the first group and the same number of the second.

These salient features of the normal vocabulary should be held firmly in mind as we proceed to the study of the development of the child's vocabulary and to the loss and disorder of vocabulary with abnormal persons.

(To be continued)

Society Proceedings

THE PHILADELPHIA NEUROLOGICAL SOCIETY

December 18, 1914

The President, Dr. Charles K. Mills, in the Chair

AN EPILEPTIC WITH CATALEPTIC ATTACKS

By N. S. Yawger, M.D.

The patient was a male, aged 27 years, who began with idiopathic epilepsy at 6 years and who suddenly developed a cataleptic attack which lasted eight days. The seizure appeared as a psychical equivalent and six months later a similar though more severe attack occurred. These episodes began with mutism and then passed rapidly into stupor with loss of bowel and bladder control. At the beginning of stupor there was general rigidity and this was so marked that it was only with difficulty that the extremities could be bent. Two days later the rigidity yielded to catatonia so that the extremities remained in any position placed until they fell from exhaustion and gravity.

CASE SHOWING WIDELY EXTENSIVE EXCITOMOTOR ZONE OF BABINSKI REFLEX

By N. S. Yawger, M.D.

A colored woman, aged 67 years, developed tuberculous caries in the 5th, 6th and 7th thoracic vertebræ with marked kyphosis. The paraplegia which was present conformed to the type of Babinski, in his cases showing the reflexes of defense. The patient was unable to voluntarily move the lower extremities; the legs were flexed on the thighs and the thighs on the abdomen. The knee-jerks could hardly be elicited and there was a bilateral foot-clonus. The Babinski reflex was typical on both sides and could be demonstrated by irritation of the skin as far up as the inguinal regions. Often with this response the legs would be forcibly drawn up as though to avoid the irritation.

LESION IN UPPER CERVICAL CORD

By George Wilson, M.D.

M. M.—52—a patient in Dr. Spiller's service at the Philadelphia General Hospital, to whom he was indebted for the privilege of reporting the case, began to have paresthesia in the little and ring fingers of the left hand two weeks after his recovery from a lobar pneumonia in December, 1911. In two months he became weak in the left arm and in three weeks

more was totally paralyzed in that part,—this was followed in a few days by weakness and paralysis in the left lower extremity.

Two weeks later the patient became partially paralyzed in the right arm and leg.

During this gradual onset there were frequent attacks of diplopia and slight difficulty in chewing and swallowing. There was no pain except a dull occipital headache.

Rectal incontinence came after the paralysis was well established and lasted some months.

He has gradually recovered power until at present he can stand and take a few steps. His arms have improved more than his legs.

Examination shows a well nourished male confined for most part to a wheel chair.

The head cannot be rotated, flexed or extended to anything like a normal extent. The eyes show that the right pupil is 3.5 mm., the left 2.5 mm. Both react well. A very distinct horizontal nystagmus is present, especially when looking to the left. On attempting to converge the right eye turns out after a feeble effort. Vision 6.6—eye grounds healthy. Cranial nerves are otherwise healthy.

There is wasting of the muscles about the left shoulder joint,—no fibrillary tremors here or elsewhere. Muscular power is pretty good in the upper extremities, greater on the right. There is greatly impaired power in the lower extremities with marked hypertonicity, but here again the right is stronger.

All deep reflexes are exaggerated, more so on the left. Bilateral ankle clonus and extensor response present. Abdominal and cremasteric reflexes are absent.

Sensation, sense of position, stereognosis are normal throughout. Station and tests for ataxia are normal.

Dr. Manges' x-ray report shows destruction of the transverse processes of the 7th cervical vertebra,—etiology uncertain.

Wassermann is negative in serum and C. S. fluid; cytological examination of the latter shows 96 lymphocytes.

The diagnosis is of a lesion involving the cervical cord, chiefly above the 5th segment—there has also been a lesion at the base of the brain as evidenced by the diplopia—the nystagmus is probably from weakness of ocular muscles.

The x-ray findings are too low to account for his symptoms. The etiological factor is doubtful—it may have resulted from the pneumonia or it may have been syphilitic.

An unusual form of disseminated sclerosis might cause the symptoms in this case.

Dr. Alfred Gordon said he would like to know whether Dr. Wilson's patient had any pain in the arms, was there any atrophy and were there also objective sensory disturbances and if there was anesthesia, in what form, segmental or longitudinal?

Dr. William G. Spiller said that some years ago he presented before the Philadelphia Neurological Society the case of a woman who had had a myelitis, proven by the microscope, at the level of the 4th cervical segment; there was no myelitis at the 5th cervical and none in the medulla oblongata. The case was interesting because of the limited focus of degeneration. The woman had had difficulty in turning her head. The lesion was more softening than true inflammation. The case that Dr.

Wilson reported might possibly be of similar type. He called attention to the fact that the symptoms developed after pneumonia. Dr. Spiller said he had known paralysis of cranial nerves to develop as the result of pneumonia; possibly from meningitis. It seemed to him probable that in the patient presented by Dr. Wilson the lesion was syphilitic although the man denied all syphilitic infection. He had, however, lymphocytosis of the cerebrospinal fluid, which was very suggestive of syphilis.

Dr. George Wilson said one other important feature he wished to mention was that the x-rays showed that the transverse processes of the 7th cervical vertebra had been destroyed. Dr. Manges took the photograph and called attention to this, but was unable to state the reason for it. There was atrophy of the shoulder girdle and no disturbance of sensation in any form.

Dr. Charles W. Burr presented (1) a case of spasmodic torticollis or tic (?); (2) a man having transitory paraplegia, or did he really lose control of his legs on account of vertigo?

Dr. George E. Price said in regard to Dr. Burr's second case that while he had never seen transient paraplegia occur in a paretic, the character of the palsy reminded him of the transient hemiplegias so frequently seen in that disease and this, in connection with the fact that the man had organic pupillary disturbance and made contradictory statements regarding his vertigo, suggested the probability of an early paresis.

Dr. D. J. McCarthy said that transitory paralysis occurs in childhood with poliomyelitis and the paralysis may entirely disappear in a few days.

Dr. Cadwalader said that Dr. Burr's remarks about his patient were particularly interesting to him because he had very recently examined a patient suffering with Ménière's disease, who had stated that after every attack of vertigo he was unable to use his lower extremities, as well as before the attack came on. Dr. Cadwalader saw this patient during the interval between attacks, and was unable to demonstrate any loss of power in the lower extremities. The reflexes were normal. Nevertheless, the patient did seem to have temporary weakness of both lower extremities immediately succeeding each attack of vertigo. This weakness gradually passed off, but required some hours.

Dr. Alfred Gordon said it might be of interest to Dr. Burr to know the history of the following case: a young man, 32 years old, in less than a year has had several attacks of sudden weakness in one leg at a time lasting several hours and accompanied by pain. The pain is over the entire limb. He said that from the toes up to the hip suddenly the man is taken with pain, begins to limp, cannot walk, has actual weakness and has difficulty in getting upstairs. Then the pain disappears. The next day he gets it in the other leg. He is a baker by occupation. He works until 5 o'clock in the morning, then has to leave his shop immediately. Whether there is any relation between this and the paralysis Dr. Gordon did not know, but the fact that he had in the past year this transient and intermittent palsy was interesting. He would have an interval of about a month or two and then again it would occur. Several years ago Dr. Gordon observed a little girl of 13 who had apparently the same symptoms as this man but in the arms. She would walk in the street and carry a satchel; suddenly it would fall out of her hand and for half an hour she could not raise her arm. Then it would disappear. Cruvellier many years ago called attention to a periodic painful paralysis. Whether these cases

have any relation to this condition he described Dr. Gordon was not prepared to say. Dr. Burr's case is one of profound alcoholism. Perhaps alcoholism has something to do with the attacks of vaso-motor disturbance which seems to be at the bottom of the condition.

Dr. Spiller said there were a number of conditions which cause transitory palsies, such as the intermittent spinal paralysis of Dejerine, which Dejerine had compared to the intermittent paralysis of vascular disease of the extremities and regarded as the result of vascular disease of the spinal cord. In the intermittent palsy of spinal origin the Babinski reflex occurs temporarily. Intermittent palsy may be an epileptic equivalent, and such a case had been presented before the Society some years ago by Dr. McConnell. An unusual case of intermittent ocular palsy, lasting a few hours, he had observed in a case of migraine with Dr. de Schweinitz. Most transient organic palsies probably are vascular in origin.

Dr. Burr said he did not know anything about the patient's reflexes because most of the attack had passed off before he saw the patient. When the man arrived at the hospital he was able to walk a little and could move his legs in bed fairly well. That was six hours after the onset. At that time there was no Babinski jerk, no ankle clonus, no exaggeration of the reflexes, nor were they decreased. Dr. Burr was inclined to think that Dr. Price was probably correct. Although he was not prepared to say that this man had general paralysis of the insane he was not altogether a normal man, but the thing that interested Dr. Burr was the thing that nobody said anything about. He was not altogether sure that this man was altogether paralyzed at all. He thought it perfectly possible that his vertigo might have bothered him more than his loss of power. The first patient that Dr. Gordon spoke of Dr. Burr would think was a case of intermittent claudication. The palsy was recurrent and associated with pain and probably due to local arteriosclerosis. Dr. Burr's patient had no pain. Nor has he any mark of arteriosclerosis. He may have a syphilitic arteritis within the cord itself and it may have been a blocking. Barring hysteria Dr. Burr has never before seen a paraplegia that came suddenly, lasted a few hours and then disappeared altogether.

Dr. E. S. Clouting (by invitation) reported a case of double optic neuritis concurrent with whooping cough.

Dr. Spiller said he had an opportunity some time ago to examine a brain from a patient with whooping-cough in which he found encephalitis. He thought the boy reported by Dr. Clouting might have had a mild grade of encephalitis, but this diagnosis he could not make positively. Whooping cough is sometimes a very serious condition.

Dr. E. M. Auer read a paper on Anosognosia and Anosidiaphoria.

Dr. D. J. McCarthy said this was not a complex which was limited to those cerebral organic conditions nor from the experience with some other diseased conditions would he think it associated with any psychological phenomena inherent in cerebral lesions. One familiar with the tuberculous would recognize this. Tuberculous patients—for example take a well-educated woman, with tuberculosis of the lungs, tell her she has consumption, that there is no question about it and she will come back months later assuming that she has no tuberculosis and nothing the matter. Not only in that type of case, but also in healed cases of tuberculosis this is interesting from the standpoint of the Freudian idea, the fact that they

have had tuberculosis and been cured will at the end of four or five years pass from their mind, it will be completely forgotten. You will have to recall to them the actual treatment, the symptomatology. Here is a condition of affairs in visceral disease and in other parts of the body in which the individuals practically present this matter of ignoring the fact that they had this definite clear cut disease. It comes into the experience of every one who handles any definite large number of the tuberculous. How far it occurs in visceral disease he did not know, but so far as tuberculosis was concerned it was true. The cases Dr. McCarthy had in mind occurred in women.

Dr. Alfred Gordon said he wondered if any analogue could be found between this psychological phenomenon and that in the so-called " stump hallucinosis " cases, in which the individual who has one limb removed still believes for months or years that he possesses an intact arm. He has not got used to the situation and believes that the power is still there. In the anosognosia the patient equally does not think of the loss of power that he sustained in his paralysis. One man Dr. Gordon had under his observation was without one limb for thirty-five years and he still feels that the arm is there. There seems to be an analogy between the two phenomena.

Dr. Auer replied that as to Dr. Gordon's remarks he would think that in the case Dr. Gordon quoted the man had become accustomed to transmit his impulses to the periphery, and consequently, though realizing that his limb was no longer there, he continued through habit to project the impulses arising from a more proximal stimulation to a more distal part. The two conditions are entirely different.

Dr. Alfred Gordon read a paper on Hydromyelia and Hydroencephalia, with presentation of specimens.

Dr. Maxwell Langdon said he noted that Dr. Gordon stated that the eyes were negative, except that nystagmus was present when looking to the left. Were there any changes of the field?

Dr. Gordon replied that it was not possible to determine the visual field because of the somnolence of the patient. The interesting part about the eyes was the nystagmus. He wished particularly to emphasize with regard to the pathogenesis of this condition. In spite of the presence of large thrombosis of the spinal artery and blood vessels he believed that the vascular condition alone could not explain the extensive destruction which began to appear at the age of twelve. The coexistence of the enormous hydrocephalus with hydromyelia and the absence of corpus callosum were more in favor of developmental anomaly of the entire cerebrospinal axis.

THE PHILADELPHIA NEUROLOGICAL SOCIETY

JANUARY 22, 1915

The President, DR. CHARLES K. MILLS, in the Chair

Dr. Charles W. Burr presented (1) a case of hysterical ataxia; (2) a case of senile paraplegia.

Dr. Alfred Gordon asked whether a Wassermann test of the blood had been made or a lumbar puncture made.

Dr. C. W. Burr said there was a Wassermann of the blood, but no lumbar puncture.

Dr. S. Leopold said he thought all of us have seen cases of syphilitic disease with hysterical manifestations. He thought this was so in this case. Not long ago Dr. Leopold had a case of syphilitic arteritis, diagnosed by several physicians as an hysterical psychosis. This man presented the phenomenon of inability to walk and every once in a while he would have this phenomenon of falling. He had had this condition ten years. Finally one day he developed a sudden nausea and vomiting and became unconscious and in about thirty-six hours he was dead, probably dying of an edema of the brain or of a hemorrhage. This was another illustration of hysterical manifestation on a syphilitic basis.

Dr. Alfred Gordon inquired whether there was any ataxia of the upper extremities and whether Dr. Burr in making a diagnosis thought of the cerebellum being involved. It seemed to Dr. Gordon when he watched the patient walking the latter presented the picture of the cerebellar asynergia in which when the legs are put forward the body does not follow the legs.

Dr. A. A. Eshner said that this discussion raised the question of the significance of the Wassermann reaction. Now, his experience has led him to believe that a positive Wassermann response does not mean the presence of syphilis by any manner of means, and Dr. Eshner thought we must look upon the Wassermann reaction as we look upon any other symptomatic manifestation, as, for example, the Widal reaction, or any other disease stigmata. There are always possibilities of technical error, as well as other forms of error, and a positive Wassermann report is of no greater significance than any other phenomenon. Dr. Eshner thought that in case of doubt from either the clinical or the laboratory side, certainly more than one Wassermann test should be made.

Dr. C. W. Burr thought of the cerebellum, of course, and of the possibility of cerebellar disease, but it cannot be cerebellar disease because very often the patient walks perfectly well. The change has nothing to do with mercury or iodide, one week he walks well and the next week he doesn't walk at all, the third week he falls about and the fourth week he walks perfectly well again. It must be an hysterical gait. He has had ataxia in his hands. At no time has he had any weakness in the hands. Coördination varies very much. Dr. Burr was inclined to think that the case was one of hysteria, but he was inclined to think that the patient also has a general paralysis in an early stage, on account of the speech, of the tongue tremor, the tremor of the lips and the slowness of thought. He is a demented man. His attitude is not that which we see in hysteria. Dr. Burr thought the man was perfectly frank when he said that he did not know that he wet his trousers. He did not think his hysteria was due to syphilis, but due to the horrible fright when the two men killed the first man and the second fright in which he was picked up and thrown about. He thought that was the immediate and exciting cause of his hysteria rather than the poisoning by syphilis.

Dr. J. W. McConnell described an unusual distribution of muscular atrophy.

Dr. Gordon said it reminded him of pseudo-hypertrophy. The condition of the right upper arm and the left lower limb reminded him very much of the type of myelopathy. We consequently have here a combination of myelopathy and myopathy plus a spinal cord trouble. The question of muscular atrophy according to the classical description with the sharp

line of demarcation which we find in textbooks cannot longer be maintained because there are cases in which you find a combination of symptoms, cases in which we find absence of the old classical symptoms and cases in which symptoms of one type are found in the other type. He thought this to be an interesting case which spoke in favor of not infrequent combination of both types and that the sharp distinction, the tendency of separating into two types of muscular atrophies, cannot be maintained with strictness.

Dr. McConnell said the expression of opinion by Dr. Gordon was what was reached in the Philadelphia Hospital. They are teaching students that the distinction between myopathy and myelopathy cannot much longer be maintained. That afternoon one man who had long been regarded as a myopathy at the present time is showing a condition of myelopathic involvement.

Dr. William G. Spiller reported a family form of nervous disease resembling paralysis agitans.

Dr. Lloyd said he had been familiar with those cases for a long time. He had always considered them as cases of toxic hysterical tremor of alcoholic origin. He thought, however, that they were rather atypical. This man to-night resembled strongly in gait and tremor a case of paralysis agitans, except that the tremor is more of the intention type. These brothers are very bad alcoholics. They stay in Blockley for a time, and then go out and lie around in cheap grop houses for several weeks and come back a great deal worse. Suggestion also makes them a great deal worse. This patient was a great deal worse to-night for so many doctors looking at him. The toxic hysterical type of tremor, described by the French, is very much like this, but not quite so much like the tremor of paralysis agitans. It is an intention tremor, and it may also be continuous during the period of rest. There was also an element of imitation in the present cases. Dr. Lloyd thought that if other cases existed in this family they should be looked upon as cases of communicated hysteria rather than as properly familial.

Dr. Lloyd asked whether Dr. Spiller had eliminated all possibility of the sister and the other brother being addicted to drink.

Dr. Spiller replied that the condition in the sister could not be attributed to alcohol. It was one of moderate spastic paralysis of the lower limbs. He was not able to accept alcohol as the cause of the condition in the two brothers. He had at one time made this diagnosis himself but more careful study of the family had led him to reject it. Hysteria certainly could be excluded.

Dr. Mills asked what the justification was for the term pseudosclerosis.

Dr. Spiller replied it was a very bad term, it is a misnomer and is so now recognized. When Westphal and Strümpell reported their cases they had found no lesions and therefore the condition was named pseudosclerosis. It is by no means a justifiable term. By some the pseudosclerosis had been regarded as hysteria, but few held this view now.

Dr. Cadwalader said that he had exhibited a patient suffering from pseudosclerosis before this society in December of 1912, and the history of this case is recorded (Proceedings of the Society in the JOURNAL OF NERVOUS AND MENTAL DISEASE of 1913, page 321). The patient had been under observation for many years and was well known at the Orthopedic Hospital.

Two of his brothers and one sister were similarly affected. The symptoms were chiefly tremor, rigidity, spasticity and contractures, which had begun in youth and had very slowly progressed.

Dr. Cadwalader said that he had subsequently been inclined to believe that this patient might have been suffering from progressive lenticular degeneration of Wilson's type, and that he had reported it under that title together with another case (Journal of the American Medical Association, October 17, 1914).

The differential diagnosis between pseudo-sclerosis and Wilson's lenticular disease on clinical grounds would seem to be extremely difficult, if indeed it is possible.

Dr. Charles K. Mills and Dr. Frank presented a report on a case of glioma of the cervical spinal cord, with exhibition of specimen, the patient having had wrist clonus.

Dr. Alfred Reginald Allen stated that he saw this case under the anesthetic in the operating room for the first time and that there were a few notes read concerning the history and examination. It was a practically bloodless operation, being one of those fortunate cases where you can rongeur well to the side and not get undue hemorrhage. This is only important because it means that a good view of the spinal cord was obtained. The particular extent of cord exposed was apparently normal in size and appearance and quite different from the enormous sausage-shaped swelling exhibited here to-night.

Dr. Alfred Gordon said that it was well known that Babinski several years ago called attention to a special reflex which he called " inversion of radius." According to him and to subsequent authors the lesion is found at about the level of the fifth or sixth cervical vertebra. Dr. Gordon wondered whether this reflex was investigated and if so whether it was present or not.

Dr. Frank stated that the patient did not have an inversion of the reflex at the wrist. As for the operation, Dr. Frank was present at the autopsy and it seemed that the wound was too low to show any of the tumor at all. The tumor was at least an inch and a half above where the incision was made.

Dr. Spiller said he had examined microscopical sections from this tumor and it was an ependymoma.

Dr. Charles K. Mills reported perseveration with Jacksonian epilepsy and motor aphasia in a case of probable midfrontal lesion.

Dr. J. W. McConnell said that when this case was first seen in the dispensary of the University Hospital the man would grasp the hand and was unable to let go of the hand.

Dr. J. Hendrie Lloyd said, as he understood Dr. Mills, the patient had a persistent tonic spasm in the arm as a symptom of Jacksonian epilepsy.

Dr. Mills replied, yes, sometimes confined to the hand.

Dr. Lloyd said that tonic spasm as the result of irritation of the cortex of the brain is not such an exceedingly rare thing. It is, in fact, the initial symptom of nearly all epileptic attacks, either focal or general. Dr. Lloyd had this fact borne in upon him a number of years ago in a case which he was called to see in consultation at the Presbyterian Hospital. He spoke of it because Dr. Mills's case recalled it to him. The arm and hand went into rigid tonic spasm so that the fingers would have to be

unfastened. This spasm was even induced by voluntary movements. There was no classical epilepsy, such as clonic spasm or loss of consciousness. It was the so-called lock-spasm. At autopsy there was found a small flat growth, located far down in the longitudinal fissure and pressing so that it interfered with the motor fibers from the arm center. That was what Dr. Lloyd supposed we were to understand as a case of perseveration. It was caused by a lesion on the median aspect of the brain. In that case the lesion was far away from the midfrontal area.

A CASE OF TUMOR OF THE BASE OF THE BRAIN, INVOLVING THE HYPOPHYSIS SECONDARILY

By J. Hendrie Lloyd, M.D.

Dr. Lloyd exhibited a large tumor springing from the membranes at the base of the brain. It had involved the hypophysis and had eroded the bones at the base of the skull. The patient, however, had not presented any very characteristic symptoms of pituitary involvement. When first seen, some months before his death, he had bilateral sixth nerve paralysis with bulbar symptoms, such as paralysis of his lips and tongue. Eventually he 'had also complete anosmia and loss of taste, with anesthesia of the palate and pharynx, also paralysis of the velum palati and of one vocal cord, and later complete choked disks and blindness, the latter coming on suddenly shortly before his death. Thus the nerves involved were the first, second, sixth, ninth, tenth and twelfth. There had been no paralysis of the limbs. As the tumor was very large, quite the size of a hen's egg, and had made pressure from the bulb behind up to the optic chiasm in front, with destruction of bone, it was rather remarkable that other cranial nerves escaped. The malignant growth extended even into the nose, and also caused great exophthalmos, with purulent discharge from the nose and orbits from secondary infection. An X-ray picture revealed destruction of the posterior clinoid processes and invasion of the ethmoid sinus. Early in the case Dr. Lloyd had supposed it to be one of diffuse syphilis of the pons and bulb, but later the presence of a tumor was unmistakable. The patient had been shown at a former meeting of the society, and a variety of opinions expressed as to the possible lesion.

Dr. Alfred Gordon stated that his suspicion at the time the patient was exhibited before the Neurological Society was based upon a remarkably interesting case which was observed and published by him of a very large pituitary tumor. One of the most conspicuous and persistent symptoms in this case which presented Fröhlich's syndrome, was the loss of sense of smell from the beginning of the time the patient came under observation, viz., about a year. The patient, a young man, was unable to tell the odor of objects placed to his nostrils. The sharpest, most acute odors could not be distinguished by him. He also had exophthalmos. When Dr. Lloyd presented his case and mentioned the persistent disturbance of smell, Dr. Gordon suggested the possibility of hypophyseal tumor, which the autopsy proved to be correct.

Dr. Spiller said he would again caution against using the loss of sense of smell as a focal symptom, unless it were one of the earliest symptoms. He had seen complete loss of sense of smell in a case in which the tumor was confined to the region of the foramen magnum.

Dr. Lloyd said he did not think he had emphasized sufficiently that this man had involvement of the pituitary body. He thought this involvement was secondary. With reference to diagnosing pituitary disease from loss of smell, he did not believe we could depend on this symptom alone. The next time he saw such a patient, and the X-ray report came to him that the patient had destruction of the posterior clinoid processes, he is going to be very careful. Dr. Lloyd had formed his original opinion, and he had been too slow in revising it. The discharge of pus which Dr. Ludlum spoke of was very marked, and Dr. Lloyd thought it was due to secondary infection. The cancerous growth came down through the base of the skull, and invaded the nares.

NEW YORK NEUROLOGICAL SOCIETY

February 7, 1915

The President-elect, Dr. W. M. Leszynsky, in the Chair

CASE OF DEFORMITY OF THE SKULL WITH OPTIC ATROPHY

By L. Shapiro, M.D.

This case was admitted to Mt. Sinai Hospital by Dr. Sachs five weeks previously, with symptoms of chorea, associated with marked deformity of the skull and optic symptoms. The boy was 13 years old, of Russian parentage; the father had somewhat abnormal changes of the skull with prominence over the frontal region, but no optic symptoms; the child had a normal birth and no peculiarity of the skull was noted; later the mother observed the eyes becoming more prominent and the peculiar shape of the head became evident; five years ago the boy had scarlet fever, complicated by severe nephritis and hematuria and generalized edema; after this he could no longer see and the blindness was attributed to the scarlet fever; before that he was perfectly well; after that the unusual height of the skull, increase in breadth at the temporal region and abnormally low ears became noticeable; this was no doubt due to premature ossification of the sutures of the vault which interfered with the normal expansion of this portion of the skull; the X-ray showed a peculiar network of thinned-out areas in the frontal region; this was due to absorption of the inner table of the skull, as had been shown at operation; as to the nature of this premature ossification, it had been observed that this condition had been noted in the ancestry of these cases and Carpenter had noted a case where four children in one family showed a similar condition; other congenital malformations were frequently present, such as congenital pulmonary stenosis and cyanosis of the face; ventral and abdominal hernias, webbing of the fingers, polydactilism, etc. One case of dermoid cyst had been observed; this association with other congenital malformations and in family groups might argue for congenital origin; the X-ray pictures showed enlargement of the pituitary fossa; this had been interpreted as being due to change in the pituitary gland which by some action caused dystrophy; this patient had no other symptoms than ocular ones associated with deformity of the skull; the exophthalmos was evident; the right eye bulged more than the left; there was no nystagmus; in some cases dislocation of the eyeballs occurred; impair-

ment of function in these cases was due to optic atrophy following neuritis; the origin of this neuritis was not well understood; because of the optic symptoms in this group of cases they were first observed by ophthalmologists; von Graefe in 1866 had recorded cases; some views as to the cause of the optic neuritis had been advanced; Virchow considered it due to meningitis at the base of the brain, which caused neuritis and subsequent atrophy; other views were that it was due to the abnormal course of the internal carotid, the pressure causing atrophy; or it might be occasioned by stenosis of the optic foramen, which caused pressure and optic atrophy; perhaps the cause might be the difference between the size of the skull and the growth of the brain and the consequent increased cerebral pressure; lumbar puncture was done in this case and there was no increase of pressure; optic atrophy, when it occurred, usually occurred before the seventh year, because the greatest growth of the brain was before that age; it was more frequent in boys than in girls and more common in dark-complexioned, sallow individuals; this boy had an organic heart lesion, due to several attacks of chorea; he was an intelligent boy, not at all mentally deficient.

Dr. Foster Kennedy said that these cases were sufficiently rare to deserve consideration. Dr. Shapiro had given a very complete presentation. One point which interested him was the reference to the optic nerve changes in these cases. Dr. Shapiro said the atrophy was of a consecutive character, following neuritis. Dr. Kennedy was not sure whether he meant papilledema or retrobulbar neuritis. The question of the pathology of the exact processes occurring in these cases was important in view of the uncertainty as to the processes which produced changes in the optic nerve. In one case studied the optic nerves were found to be white, in another pallor was present in the temporal region. That would point to the fact that loss of vision was not due to papilledema. It might be produced by pressure of the bony ring on the nerve, a process analogous to the pressure produced by sinusitis and by frontal tumor.

Dr. Abrahamson said the thanks of the society were due to Dr. Shapiro for his very able presentation. The interesting point in the disease was the causation of the fundus changes. Internal hydrocephalus failed to explain them in very many cases. Enelin in 42 cases found twice double neuro-retinitis, twice papilledema on one side with neuritic atrophy on the other; twice an apparent primary optic atrophy; thirty-six times post-neuritic atrophy. Cases were reported of oxycephalus with open sutures except the coronal and open fontanelles; with congenital meningoceles; with changes in the eye grounds essentially on one side. The problem was very important, since it determined whether decompression of callosal puncture was advantageous as Anton had suggested. Behr believed that the narrowing of the optic canals and the bony dislocation with displacement of the internal carotid artery and compression of the optic nerve by the pulsating artery, were the important factors. The gradual concentric diminution of the visual fields found could also be explained that way. Central scotomata, as in Dr. Kennedy's case, were rare.

Dr. Jacoby had no remarks to add, but he thought the explanation advanced by the last speaker a plausible one. The cases were extremely rare; he had seen practically none, he had only read of them.

Dr. Shapiro said he would show X-ray plates of this case and one of chronic hydrocephalus for comparison.

SYPHILITIC MUSCULAR ATROPHY

By Junius W. Stephenson, M.D.

The patient was a married man, aged 42, who denied all venereal infection, but admitted excessive use of alcohol for fifteen years. He was the father of two children; his wife had no miscarriages. History antedating present illness was uneventful. Eighteen months ago patient had noted a weakness of his left hand which had progressed rather rapidly for several weeks, after which he stated that it had remained stationary. About six months following this the right hand was attacked in the same manner and progressed quite rapidly for a period of several weeks when it became stationary. There was no pain or paresthesia. Physical examination revealed double drop wrist with wasting of the thenar and hypothenar eminences, more marked in the left hand; also there was considerable wasting of the interossei, more marked in the left hand; extensors of both wrists were very weak, causing a double drop wrist. There was a slight thinning of the left deltoid. The right knee jerk was present but very sluggish; the left was questionably elicited under reinforcement; ankle jerk was not elicited. Plantar, flexor, abdominal and epigastric reflexes were active and equal. There were no sensory disturbances. Pupillary mobility was good; no nystagmus or diplopia. The right pupil reacted somewhat slowly to light; the left fairly; there was a slight irregularity of outline. There had been a perforating ulcer under the right great toe of one year's duration and patient stated that five or six years ago he had "perforating ulcers" under both great toes which were said to have responded to treatment. Inconstant fibrillary twitchings had been observed. Electrical reaction of the atrophied muscles was as follows: muscles of thenar eminence of left hand showed very slight response to full faradic coil $CCC = ACC$. The other muscles of left hand showed slight hyperexcitability to faradism; galvanic o. k. Muscles of right hand responded to increased amount of both currents; left shoulder o. k.

Serology-serum Wassermann positive; spinal fluid Wassermann positive; no globulin excess; 28 cells per c.mm. reduced Fehling's solution. Urinalyses negative and blood negative for lead findings. The clinical course and serological findings, Dr. Stephenson said, left no doubt as to the diagnosis of this case, which he presented as a muscular atrophy of luetic origin, the pathology of which, though not as yet universally accepted, was probably luetic endarteritis with thrombosis of the anterior horn vessels. Of course the condition of the various reflexes also indicated posterior column involvement, and the case might be considered as a case of tabes with atrophy, but the clinical course was so characteristic of the condition described by Dr. Dana as syphilitic muscular atrophy in which he recognized a distinct neurological entity, that the present case was presented as an example of it.

Dr. Foster Kennedy thought cases of atrophy in the hands associated with systemic changes in the spinal cord were not exceedingly uncommon. There was an alternative pathology. The case might be one of tabes with a well-marked annular constriction which had produced nipping of the roots of the cervical nodules, or a premature degeneration of the tissue of the anterior horn. One saw occasional cases of tabes in which there was well-marked muscular atrophy in the hands. He had seen one case

with such hands, with present ankle jerk, no knee jerk and double exten-
sor responses. This would be accounted for by pressure in the cervical
region by hypertrophic meningitis.

Dr. S. E. Jelliffe thought that this patient was allied with the group
of tabetic cases so well described by Dejerine and the French writers.
From the distribution of ulcers in the lower limb and of the atrophies
of the upper extremities, it was probably a radicular type of tabes. These
are not infrequently met with.

Dr. Stephenson said he saw a similar case a year ago presenting the
atrophy with no change in the jerks or pupils who, about three months
later, developed a typical picture of tabes. There had been no pain, nor
had they been able to elicit any sensory disturbance of any nature. The
cases of pachymeningitis which he had seen had all presented pain and
spastic phenomena. The case here shown presented flaccid findings with-
out pain, therefore he thought we could eliminate the condition known as
pachymeningitis. As stated the case might be considered tabes with
atrophy but he preferred to assume that the initial lesion was a vascular
one affecting the anterior horn, and that the patient was now developing
a posterior column degeneration.

CASES OF BASEDOW'S DISEASE, TREATED BY X-RAYS

By A. Polon, M.D.

The seven cases presented came from the outdoor service of Dr. I.
Abrahamson, at the Mt. Sinai Hospital, and were treated by Dr. Polon
with Roentgen rays at the department of radiotherapy of the same insti-
tution. The cases chosen belonged to the clinical groups classed as hyper-
thyroidism and morbus Basedovi. All of the cases had goitrous enlarge-
ment. The rationale of this therapeutic procedure, Dr. Polon stated, was
based upon the biological phenomenon that glandular tissues were inhib-
ited in function and growth, and were even caused to atrophy by the
radiation emanating from an X-ray tube. The method used presented a
modification of the one commonly in use, in that the dosage administered
was usually massive, applied at frequent intervals, the ray being of high
penetrating power and filtered through one or two mm. of aluminum.
The working formula was as follows: distance of nearest point of skin
from anticathode 20 cm., milliamperes 6, spark gap 15 cm., time of ex-
posure 3 minutes, filter 2 mm. with the usual protection of skin from
the secondary filter radiation; interval between treatments 14 days. The
Coolidge system used permitted of exactness and constancy of dosage.
The patient was placed in reclining posture, the thyroid region being
divided into two or three parts, each being rayed separately while the
others were protected. Treatment of about 35 cases of hyperthyroidism
and morbus Basedovi with goitrous enlargement, of which seven cases
were presented, permitted of the following conclusions: (1) The size of the
enlarged gland was definitely diminished by Roentgen-rays; (2) the dimi-
nution in size was commonly associated with an amelioration of all the
symptoms, especially in early and mild cases; (3) uncommonly a diminu-
tion in size of the gland might be effected without a change in the general
symptomatology; the shrinkage of the thyroid could not be ascribed to
ensuing myxedema, since the Basedow symptoms persisted; (4) the

course of the disease was not aggravated by the treatment even in those cases in which no change in the gland was observed; (5) the application of the ray did not preclude, nor did it interfere with other modes of treatment; (6) cases refractory to surgical, serological, gland feeding and drug therapy were benefited by Roentgen therapy. The main features of the cases presented were as follows:

CASE I. 36 years; hysterectomy 6 months; ever since pronounced symptoms of morbus Basedovi; marked enlargement of thyroid; circumference measurement 15.5 in.; insomnia; psychic disturbance; anorexia; loss of weight; tachycardia 120; since December 9, 4 massive treatments; improvement at present in all signs and symptoms; glandular circumference diminished by one inch; sleeps well; gain in weight; pulse rate 90; improved mental attitude; still under treatment.

CASE II. 17½ years; female stenographer; duration 1 year; tachycardia; palpitation; exophthalmos; tremor; prominence of isthmus; treated from June 20 to July 25, 4 times, two full, two half doses; pulse now 84; feels well; thyroid diminished; continues work past six months.

CASE III. Male, more severe case; 21 years; post-office clerk; onset after severe scarlet; came to clinic February 5, 1914, complaining of intense precordial pain, palpitation, weakness, irritability; measurement of thyroid anteriorly 15 inches; pulse 110; von Graefe $+$; Moebius $+$; received 10 treatments between February 5 and March 11, representing 5 massive doses; amelioration of symptoms; gland diminished 1 inch; pulse 80; gained 10 pounds weight; not been at clinic since March, 1914; has been working since. This is one of the few cases that show improvement after exophthalmos has been established.

CASE IV. Female, 39 years; duration 1 year; enlargement of thyroid; tachycardia; tremor; moderate exophthalmos; received 4 massive doses since December fifth last year. Improvement in all signs and symptoms, including diminution of thyroid measurement from 14.5 to 13.5 inch.

CASE V. Female, 28 years; persistent enlargement of gland with pressure symptoms 2 years; all other signs of Basedow's; 3 treatments since December 26, 1914. Amelioration of all symptoms, including diminution in size of gland.

CASE VI. Female, 32 years; operated upon thyroid 2.5 years ago; followed by all signs of unfavorable Basedow's; gland continues to enlarge in spite of intensive raying; 8 massive doses in 3 months.

CASE VII. Female, 39 years; 22 months duration before treatment; glandular enlargement; tachycardia; nervousness; 6 massive treatments between July and December, 1914. Symptoms at this date, slowing of pulse 84, decrease in size of gland; general condition improved; gland presents characteristic diminution.

Dr. Leszynsky asked what was the change in the size of the gland generally.

Dr. Polon said from one to one and a half inches in the circumference of the neck on the level of the plane passing through the spine of the seventh cervical vertebra posteriorly and the most prominent point of the thyroid gland anteriorly.

Dr. Kennedy asked if the first patient had an oöphorectomy as well as a hysterectomy.

Dr. Polon said no. He added a word of warning regarding the need of allowing a sufficient time to elapse (from 5 to 6 weeks) after the last X-ray before exposing the patient to the risk of operation, as the surgeon

might find that the incision would not heal because of a radio-dermatitis which delayed its manifestation.

Dr. S. E. Jelliffe said he felt very much interested in the remarks of Dr. Polon. He wondered why the factor of etiology had not been emphasized. Exophthalmic goiter was a large syndrome produced by a number of conditions, many of which were well known. The discussion would most profitably be limited to forms in which definite changes in the gland itself caused the condition. The changes due to emotional disturbance would not be helped by the X-ray. Unless there were glandular changes per se, patients were not likely to be benefited.

Dr. Kraus asked whether the blood changes had been followed in these cases. This might seem irrelevant, but, as Dr. Jelliffe had said, there were more than one kind of exophthalmic goiter; there was that caused by local thyroid changes and that caused by distant organs with functional thyroid changes; there were changes in the thymus, probably more frequently in the former group and depending upon the duration of the disease. The Germans had differentiated two types—Basedow-thyroid and Basedow-thymus. The former was associated with sympathetic symptoms in the main, the latter with parasympathetic, though this did not rule strictly. Basedow-thymus was often associated with a form of status thymo-lymphatis—the Kocher blood picture was said to be due to this status, hence it would be interesting to know the changes in the blood picture in order to appreciate whether any treatment were affecting the thymus and lymph system and in what way. Correlation of the symptoms in the light of the vegetative nerve system would help also.

Dr. Timme said it would be interesting to know whether besides diminution in the size of the gland there was any relief of symptoms produced by enlarged thyroid. He had seen one case where the size of the thyroid was reduced but the parathyroid was stimulated to activity; the tremor and tachycardia were markedly increased. Following the cessation of X-ray treatment the patient was no better than before. In regard to the measurement of the decrease of the gland, it was a very difficult thing to get. He had seen an excellent method, devised by Dr. Woodberry, of Clifton Springs, for getting the upper and lower poles and the diameter of the thyroid gland.

Dr. Abrahamson said the presentation of some of the cases treated by the method described was to call attention to this mode of therapy. This was merely a preliminary communication to encourage others to treat cases in a similar fashion. At a later date, when the number of cases reached 300, a more extensive study would be forthcoming. Then the various types of the disease and the many etiological factors would be grouped and studied. At present no such attempt had been made. At the present time there were certain types in which there was no improvement in signs and symptoms even though the thyroid had diminished markedly in size. They had had no accidents and up to date no myxedema. The rôle of suggestion as a cause for improvement was being considered carefully. Surgery had failed so often and here was a therapy apparently free of danger which yielded apparently good results. The future must decide.

Dr. Onuf said he would like to ask Dr. Polon how he would guard against bringing about myxedema, since to his knowledge the effect of the treatment often did not cease or did not become manifest until many months had passed after treatment had ceased, making it very difficult to let the reduction go to a certain desired point, and no further.

Dr. Leszynsky said he noticed no reference to exophthalmos and would like to ask if exophthalmos had existed and had disappeared.

Dr. Polon in reply said that with regard to the etiology of these cases they were able to establish in all, or almost all, an emotional factor. Nevertheless, they concluded that the emotional experience played a minor part in the etiology. It was often the last straw which broke the camel's back. The main interest and attention were directed to the clinical course of the disease, as it was affected by the decrease in the size of the gland through the agency of the X-rays. With regard to blood findings he regretted that no blood examinations were made, but provisions for doing so in the future were in progress. Regarding the diminution in the size of the gland upon the general symptoms they had come across three cases in whom, although a diminution in the size of the gland was affected, the symptoms still persisted. None of the cases shown to-night belonged to that group. In these there was a distinct ratio between the changes in the gland and the changes in the symptomatology. In regard to a more exact method of measuring the size of the thyroid gland they had found the spine of the seventh cervical vertebra and the most prominent point of the gland to be reliable, but would be glad to try the method spoken of by Dr. Timme. As to myxedema, they had met with no such experience. Speaking of exophthalmos, there was always exophthalmos of varying degree, but a pronounced exophthalmos appeared to be an unfavorable prognostic sign even if the ray caused shrinkage of the gland.

ADDRESS OF RETIRING PRESIDENT

By Smith Ely Jelliffe, M.D.

The New York Neurological Society was founded in 1872. After two years of quiescent existence it was reorganized, and now represents the oldest society of its kind in the United States.

It has a creditable history of forty-two years of active service, and the speaker felt it a special mark of privilege to have been chosen as the president, and to have served two years. The measure of success attained during this period has been due to the individual members. He had tried solely to direct their energies and to make a platform upon which they could range their work with that of their predecessors. And now, in relinquishing the leadership, he wished to tender to them his word of thanks with sincere appreciation for the support they had accorded him.

Retiring presidents seem to have left but few traces of their farewell utterances, for he was unable to find any guides which might be a lamp unto his feet in this most difficult of all tasks, namely, that of uttering one's own funeral oration.

Turning to Holy Writ, therefore, for inspiration, he found that prophets have accrued much merit by foretelling what has already happened, and so in reviewing the work of the past two years he would tell what he had in mind, what he *had* planned to do, when they elected him president.

Had they not meted out such good measure heaped and running over he would not have been such a good prophet. In view of this wealth of material, therefore, he would not attempt any detailed recounting of it,— most of them have contributed to it,—he would endeavor to give a some-

what rapid glance at the main trends: In the first place the most striking feature of the material offered has been its great catholicity. All aspects of nervous structure and of functioning have received their attention, and a firm and progressive advance has characterized their activities.

How best to show this wide range of work done presents many difficulties. To surmount these, and to get away from any statistical summary of the various papers and cases he ventured to present the principles which guided his prophetic footsteps in leading their intellectual activities during the years of his office.

It has seemed feasible to regard the nervous system, speaking very broadly, as operating at three levels: through the course of ages these have been built up, not at all sharply delimited, but gradually and imperceptibly merging the one into the other, until this completed structure, through successive intergradations, has reached the dignity of the most important structure in the universe. These levels are familiar: we shall speak of them as the vegetative, the sensori-motor, and the psychical levels, respectively, and will utilize the terms, vegetative neurology, sensorimotor neurology, and psychical neurology, not as indicating three different kinds of neurology, but rather one, which working at different functional levels is finally integrated in that master spirit of evolution, the nervous system.

Through countless ages that inexorable experimenter, nature, has built up a series of successful models into a unity, the chief cleavages of which are merely suggested in order that such a conception might make the facts more readily handled. To attempt to make any such scheme of cleavage a ground for exclusion of any one level, as sufficient to handle the facts of neurology is to invite failure.

Man is not solely a metabolic apparatus, accurately adjusted to an adaptive regulation of most marvelous efficiency and intricacy, through the vegetative neurological mechanism; nor do his sensori-motor functions make him solely a feeling, moving animal, seeking that which we call pleasure and avoiding pain, conquering time and space by the enlargement of his sensory possibilities and by the magnification of his motor powers; nor yet is he solely a psychical machine, which by means of a masterly symbolic handling of the vast horde of realities about him, has given him almost the power of reality itself. He is all three, and a neurology to-day that fails to interpret nervous disturbance in terms of all three of these levels fails in its high mission. This society has lived up to this criterion throughout its history and it has been the pride of each president that it has continued to carry out such a program.

During the last two years were presented, as contributions to the physico-chemical level, much timely work, both new and important on the vegetative nervous system. The foundations laid by Langley and the English school have been built largely upon by the Vienna school, and all medical problems have had a new light thrown upon them by the more precise anatomical and physiological knowledge recently acquired in this field. Through the study of the reciprocal activities of the sympathetic and parasympathetic systems, the entire group of metabolic activities has become much more comprehensible. The active and delicate adjustments of the physical and chemical needs of the tissues are as we have seen dependent upon these structures. Tissue hyperplasias, such as are seen in dermatoses, cirrhoses, scleroses, carcinoses, gummatoses, etc., are the more readily explicable by means of this concept, that of the reciprocal

activities of the vegetative nervous systems. The eminently practical problem of that which Eppinger and Hess have called the " vagotonic constitution " has been brought to the attention of the society, and as a corollary flowing from these researches, some of the most striking syntheses have resulted.

Thus the activities of the whole group of the endocrinous gland disturbances have become comprehensible, and it is quite doubtful if a purely chemical concept, such as the hormone hypothesis, will handle the facts. The anatomical pathways, the synaptic integrations with other levels, show readily why pain at a sensori-motor level may induce loss of tissue-tone and furthermore enable one to trace the anatomical and physiological connection between repressed desires, acting at the symbolic or psychical level, and enteroptoses, gastroptoses, vascular spasms and inequalities, skin atrophies and hypertrophies, and a host of changes in the body structures, a number of which have been shown here as chemical cases. A new syndrome, Pilous Adiposity, was presented before this society—an endocrinous constitutional anomaly. An entire revision of the whole embryology and anatomy of the hypophysis was a contribution from one of this society. The eminently practical problem of brain surgery, and some of the causes for disappointment following operations were presented, in which the kernel of the whole situation, namely, localized cerebral swelling or tissue edema receives its chief illumination from the study of the vegetative system activities upon the cerebral vessels.

Thus not only every field of medicine, but many problems in surgery receive most important clarification if the activities of the vegetative nervous system be taken into the mental grasp of the observer.

Reluctantly the president passed over this oldest phylogenetic level to glance even more hastily at the summaries and new work at the vital level which this society has fostered during the past two years. Perhaps the most striking of all the work in the field of sensori-motor neurology has been that clustered about the problems of syphilis of the nervous system. Early in 1913 the *Treponema pallidum* was discovered in the central nervous system, and demonstrated by its co-discoverer, one of the members of this society. This discovery has settled the controversy relative to a host of problems upon nervous syphilis. In rapid succession have been presented the attempts made to reach the organism by specific therapy in the elaboration of the Swift-Ellis treatment and its modifications; a thorough résumé of the pathological features involved has been presented, the peculiar lymphatic blockings which throws some light on the difficulties of cerebral tissue penetration demonstrated, and a group of experiments shown looking forward to the best means of seeking tissue penetration by remedial agents in order to reach the syphilis organism.

This eminently practical problem of the treatment of all forms of nervous syphilis, suddenly reilluminated by the discovery of the causative factor, has also been clarified by a very full setting forth of contemporary experience from the chief clinics of Frankfort and Hamburg. This society has reason to congratulate itself that one of its members was the chief discoverer of the *Treponema pallidum* in the brains of paretics.

Of the newer syndromes in sensori-motor neurology which have been shown, may be mentioned, dystonia musculorum progressiva, myotonia atrophica, cauda equina neuritis, and progressive lenticular degeneration.

Most illuminating and progressive work in spinal cord tumors has been brought to the notice of the society and a large mass of fascinating clinical material of spinal cord and brain lesions.

Cerebellar mechanisms and cerebellar localization have also claimed attention. Barany's important researches in localization and clinical cerebellar diagnosis have received extended discussion; while the cognate subjects of midbrain tremors, the pathology of the motor phenomena of paralysis agitans seen as lesions of the cerebellar static equilibrium pathways, the demonstrations of the extra-pyramidal tract signs in disordered cerebellar disturbances in chorea, and the cerebellar types of multiple sclerosis and their separation from related lenticular degeneration syndromes, these had all come before the society.

Last, but not least, this society has not neglected the consideration of the most highly evolved and socially most valuable of all of the levels of the nervous system, i. e., the psychical or symbolic. This is the most active field in neurology to-day, and its relationships to the preceding phylogenetically older levels are being analyzed with bewildering activity. In no branch of medical science has the evolution of the concepts necessary to handle the facts been more active than in this particular field of psychical neurology. How rapid has been the change in formulations in the paranoia domain alone was the subject of the speaker's inaugural address.

The interesting and important subject of comparative psychiatry has received illumination from a study of hysteria in a primitive folk, the Eskimo, while the problem of psychoses among the Jews has been presented in a masterly manner. The manic depressive psychoses among children have also received attention. An entirely new light has been cast upon the subject of the traumatic neuroses and the unconscious factors of revenge have been laid bare. The psychogenic factors in a group of disorders heretofore too narrowly viewed in the light of sensorimotor level affections, due to vegetative level disorders, has most amply shown that the psychical levels must not only not be ignored, but are probably the most important, if not the determining factors in the initial causation of these disturbances. It has already been shown how emotional, i. e., psychical factors produce marked reactions at vegetative levels, that such reactions are capable even under experimental control of inducing transitory and permanent tissue changes, as has been demonstrated following ligature applied to the vagus, for the changes in the gastric mucosa. Thus we have had presented the importance of psychical factors in epilepsy, in a group of tics, in tabes dorsalis, in spasmodic torticollis, and in dementia præcox.

Medicine is only on the threshold of this important field, in which an entirely new psychological scale, the Œdipus complex, has been applied to measure social phenomena. This concept, in general, means the instinctive biological direction of the reproductive instinct toward the type of the parent of the opposite sex, and away from the type of the parent of the same sex. Following this there results the subsequent deviation or sublimation according to group instinct toward the socially permitted object in the ideal love relation, and the development of the Christian ideal of brotherly love. This permits the building up of the social group on the basis of the freeing of the individual from the family neurotic romance. These factors have been set forth in at least three different aspects.

The pragmatic aspect of the whole psychoanalytic movement has been set forth by means of a comparison with certain factors in modern philosophy, as seen in the work of Bergson, the factor that makes cures possible not only in psychoanalysis but in the entire domain of psychical neu-

rology, which makes up at a minimum 50 per cent. of the entire practice of medicine, has received attention in a study on Transference, while the ethical implications and socially constructive values of psychoanalysis have been amply set forth at our last meeting.

With such a record the speaker felt they could pass on to even greater achievements in the year to come.

ADDRESS OF THE PRESIDENT-ELECT

By W. M. Leszynsky, M.D.

In assuming the office of president, the speaker wished to express his thanks and also his appreciation of the honor conferred upon him. While it has been customary for the president-elect to deliver a so-called inaugural address or read a paper upon some neurological topic, he hoped they would pardon him, if he established a precedent by dispensing with this time-honored tradition.

Having no new policy to announce, nor new scheme to outline, they would not be disappointed, he felt sure, when he told them that he would limit himself to a few brief remarks.

Several years ago a former president-elect said in his address that the transactions of the meetings of the Neurological Society seemed to lack the animation and enthusiasm of former days, and he ascribed this to a phase of evolution, for want of a better explanation. There had never been any acrimonious discussion and harmony had always prevailed, but such a condition of affairs at that time, while apparently true, proved to be evanescent. Since then, neurology has become such a fascinating branch of medicine that it has attracted a larger proportion of practitioners and research workers than heretofore, the number of members in this society being greater than has ever been known in its history.

At the present time, however, a pessimistic attitude is not justifiable, for there are many fertile neurological fields awaiting development, which have not failed to interest an ever increasing number of zealous and industrious students.

On the other hand, we are still awaiting a satisfactory solution of the old but vitally important problem relating to the establishment and endowment of a special institution for the care and treatment of people of limited or moderate financial resources, who are afflicted with disorders of the nervous system. The lack of suitable and adequate provision for a large and rapidly increasing number of such unfortunates, who are ineligible for admission to a general hospital, or institution for the insane, is more in evidence than ever. While this subject did not come strictly within the scope of their scientific deliberations, it was of such paramount importance at the present time, that he would suggest that they, at least, should present this aspect of medico-social economics to the attention of all philanthropically inclined persons on all befitting occasions.

It would seem that this is an opportune time for a passing reference to the subject of psychoanalysis and it is not without some hesitation and personal misgiving that he touched upon this topic. It must have been evident to any unprejudiced observer that more time has been devoted to discussion (both polemical and uncomplimentary) in this field of endeavor than is commensurate with the results, when we consider the

antagonism it has engendered, and that its applicability is admittedly restricted.

In consequence of the energy expended by its advocates and opponents, particularly the former, a new era seems to have dawned upon us recently, in which neurology has become threatened with a subdivision into specialties, namely, organic neurology and esoteric Freudism.

Whether or no this is a significant sign of parlous times, it is impossible to state, but he was, however, unwilling to admit that the majority of neurologists are sufficiently credulous to seriously entertain such a chimerical notion. Without entering into a discussion upon the merits of such a revolutionary tendency, he desired to state that the New York Neurological Society will, nevertheless, continue to welcome the unorthodox agitators among its members, although the present administration has pledged itself to maintain its well-established scientific and ethical standards.

Among the younger members of the society are many possessed of neurological training of a high order, to say nothing of ambition and enthusiasm, and who have been frequent and valued contributors at the meetings. There are others who undoubtedly possess similar qualifications and much latent talent, but have remained inactive probably through diffidence. Let us hope that this society will never suffer from a superabundance of latency, an unfortunate condition which has so often proven fatal to progress in other organizations.

It will always be the speaker's endeavor to encourage the younger men to actively participate in our scientific work. The presentation of clinical material demonstrating uncommon or rare types of disease of the nervous system will continue to be one of the essential features of our program.

In conclusion, he urged upon them, regular and prompt attendance at the meetings and bespoke their active support and coöperation, trusting that during the present year a new impetus will be given to neurological research through the energetic efforts of the members of this society.

AN ANALYSIS OF THE ACTION OF MORPHINE IN THE LIGHT OF THE VEGETATIVE NERVOUS SYSTEM

By Walter Max Kraus, M.D.

The speaker stated that the action of morphine in terms of the old pharmacological conception was said to be narcotic. However, the action upon the eye and the bladder sphincters was accelerator. Thus the narcotic effect did not extend to all parts. Considered in the light of the new pharmacological conceptions of the vegetative nervous system, we found that morphine increased the activity of the vagus to the heart, and decreased the activity of the vagus to the gastro-intestinal tract. Thus it was not universally depressant. It should not be forgotten that small doses of a drug might have an opposite effect to large doses. This applied to morphine. Morphine in therapeutic dosage depressed all secretions except that of sweat, and depressed this in chronic morphinism. All smooth muscles were depressed in activity except the sphincters of the eye and bladder. But morphine acted upon the central apparatus, not the periphery. By analogy to natural or chloral hydrate sleep, we could see that miosis was depression. Thus, morphine's action equalled func-

tional depression. The two functions of the bladder, to hold and to excrete urine, were depressed. If it were full, and unemptied, due to sphincter spasm, it could hold no more—diminished function; and if there were sphincter spasm it could not excrete—diminished function. Morphine did not increase the motor reflex activity of the spinal cord in therapeutic doses. Hence it stimulated, if anything, cerebral inhibition instead of narcotizing it. The example of stimulation of inhibition (heart vagus) and depression of stimulation (intestinal vagus) was true of all other vegetative organs. Dr. Kraus concluded, therefore, that the central effect of morphine in moderate dosage was to increase inhibitory actions and to decrease stimulatory actions. The peripheral result was always depression of function.

Dr. S. E. Jelliffe said that he could not add anything to this paper. He would like to ask Dr. Kraus if he had any light to throw upon the action of drugs on the synaptic junctions. What comparisons could be made as had been made for alcohol on the one hand in raising and of strychnine on the other in lowering synaptic junction thresholds?

Dr. W. D. Timme said that Dr. Kraus had made good use of his facts. It was very difficult to generalize on this subject. What generalization was possible he had used. To suggest some of the difficulties of such an investigation, in the first place morphine was always said to have a depressing effect upon the sympathetic centers and a corresponding irritating effect upon the autonomic or parasympathetic centers. That was only true in man and one or two animals, for instance, dogs. In cats the effect was quite the contrary. In cats we had a peculiar action of the pupil; it dilated; so also was the case in the bovine. So there we had a contradictory action of morphine. There were differences in the anatomic and the physiological autonomic systems from the pharmacological autonomic system. Langley, Bayliss and Starling had traced the physiologic sympathetic influence of the control of the sweat glands in the skin. Meyer of Vienna had proved that these glands were affected by an autonomic stimulus, such as pilocarpine. When it was seen that the influence was different in man from the lower animals, and that even in man it did not correspond to the anatomical conditions, to correlate these facts with such a drug as morphine was very difficult. Dr. Timme said he understood that this was a preliminary paper. If the investigation was to continue and be subjected to the proper controls, he thought the work was highly necessary, not only with morphine, but with other drugs.

Dr. Kraus said that as he understood Dr. Jelliffe's question, he asked upon what point in the course of the nerve pathway morphine acted. Nobody knew definitely, as far as he could say. If you took two lines (diagram), representing sympathetic and parasympathetic fibers, and joined them by a third, centrally, you had the general plan. The action was not peripheral. Hence it must be central. It was in all probability upon the endings of the sympathetic inhibitory center, going to the parasympathetic center. This inhibitory mechanism must be much like that described by Sherrington for the regulation of agonist and antagonist.

Dr. Jelliffe said he thought the center was not in question. His request was with regard to the synaptic threshold. The periphery received the stimulus and passed it on to the next neurone, over one or more synapses. What effect did morphine have in facilitating or retarding the passage of impulses over these synapses, comparing it to the supposed actions, say, of alcohol or of strychnine?

Dr. Kraus added that the action of morphine was stimulatory upon some centers, depressant upon others. It was confusing at first. It was impossible to account for the action, if it was called depressant, upon the center. It could not be so upon the intestine, for instance, for, if it depressed the central sympathetic inhibition to the parasympathetic centers, the vagus would be overactive, which it was not. As to the sweat glands this was the one exception to the rules of vegetative neurology. Though the sympathetic nerves upon electrical stimulation caused sweating, adrenalin did not and pilocarpine did. In chronic morphinism there was hypoidrosis. The action of morphine in many other animals was very complex, but in man he felt certain that it was as he had represented.

Translations

VAGOTONIA

A Clinical Study

By Privatdozent Dr. Hans Eppinger and Dr. Leo Hess

of vienna

Translated by William Max Kraus, A.B., M.D., and Smith Ely Jelliffe, M.D., Ph.D.

Therapeutic Observations

Our attempt at the close of our article to outline therapeusis leads us first to emphasize one point, that therapeutic measures, which we shall recommend are not directed against vagotonia as a constitutional condition, but against those symptoms of irritation in the autonomic system, which may be considered as irritative states superimposed upon the constitutional condition.

Atropin is the best antidote for the spastic states. It is of therapeutic value, as well as diagnostic value, and should be tried in all diseases, due to or associated with vagotonia. Not only is its paralyzing action of value, as a therapeutic agent against symptoms, but it may also be of value in combating the etiological factor. It may be used to great advantage in bronchial asthma, in which small doses may be used without danger for many weeks. It should be given in doses of one to two milligrams a day, subcutaneously. In the course of the treatment, this may be increased to three milligrams, after which the former dosage is resumed.

Another group of conditions, in which atropin is very useful, is that relating to vagotonic gastric disturbances, gastric ulcer (Tabroal) and hyperacidity, as well as gastric crises. The addition of atropin is often required, when gastric disturbances follow the use of the infusion of digitalis. Atropin is also of great

value in treating cardiac conduction disturbances, as well as the troublesome subjective symptoms of extrasystolic arrhythmias.

The harmlessness of atropin demands that it be used more extensively than hitherto. Atropin should be tried if, combined with those varied obscure and troublesome complaints, which, due to lack of anatomic basis, are called " nervous," a patient is found to show signs of a vagotonic constitution. There is no need of discussing at length those substances which contain atropin, as belladonna and eumydrin. The latter has been used to advantage in the night sweats of tuberculosis.

If it is certain that the pathological condition to be treated is caused by vagotonic stimulation or irritation, and it is found that atropin is not a benefit, indeed may make the condition worse, the reason is that the dosage has been too small. We feel that atropin is but a substitute for some physiological " atropin " which is circulating in the body. The limitations of its use are that it does not affect all branches of the autonomic system equally—the pelvic nerve being but slightly affected.

The beneficial affect of adrenalin in many spastic states of the autonomic system (bronchial asthma, many forms of gall-stone colic, diarrhea) is a good proof that both symptomatically and etiologically vagus paralysis and sympathetic stimulations are closely allied.

Closing Remarks

The value of the researches, which have been presented, should be many many-sided. Above all, we believe that we have paved the way for a new subject, the neurology of visceral organs. When one stops to consider to what degree the pathology of the peripheral nervous system has been developed, it must be a source of shame to the internist that he must admit that there scarcely exists a pathology of the nervous system of visceral organs worthy of the name. The main reason for this up to now has been the scanty knowledge of the physiology of the nervous system, one which at best is hard to understand. We know full well that many of the things, which we have stated, stand but on unsteady ground, but, in spite of this, we hope to have given the impetus to further investigations, which may be of great significance for special pathology and therapy.

In many instances, we have been able to draw conclusions

from known physiological reactions, in many we have been constrained to study physiological reactions first, since the diseases, in which we were interested, had not themselves been authoritatively worked out.

Much light will undoubtedly be thrown upon pathology, if we consider it in the light of the physiology of the visceral nervous system. We have attempted to describe a state of increased irritation in the domain of the extended vagus on the basis of the differentiation of the autonomic and sympathetic nervous systems. We did not attempt at first to determine whether the action was predominatingly central or peripheral, but only that under certain circumstances the one system reacted to stimuli which in normal physiological states would scarcely be appreciable to a greater degree, and with more intensity than under normal conditions.

The name of *vagotonia* was chosen to describe this state when it occurred in the entire autonomic system. And it was shown by clinical observations to be a constitutional anomaly of no great infrequency. It seemed worth the while, also, to show that this nervous state of a certain class of individuals was not infrequently to be reckoned with in the various conditions of disease. Thus many cases which until now have been described as intestinal neuroses could be shown to be identical with vagotonia, or at least vagotonia may be considered responsible for the course and symptoms of the condition.

We have tried to show, furthermore, that many diseased states are associated with autonomic stimulation, and that the possibility existed that a constitutional tendency of the organism, to react in a definite way to such stimulation might lie at the root of the matter. We not only believe that due to this constitutional makeup, the vagotonic reacts differently from a normal person to spastic states, but the vagotonia may be manifested symptomatically in almost all states of disease. When we stop to consider that almost every function of the intestine, and perhaps metabolism, in addition, are under the control of the autonomic nervous system, it is not difficult to see that an increased irritability of these visceral regulators, combined with the continuous flow of vagotonia influences, must be of great import in the course, not only of physiological, but also of pathological processes.

The real etiology of vagotonia must be sought in some dis-

turbance of the internal secretions. Not only has an insufficiency of the chromaffin system been proved to exist in certain types of endocrinopathic individuals, but it has also been shown that these same individuals have a lymphatic system which is more strongly developed than normally.

When we consider that vagotonia exists more markedly in the young we may readily feel that some relation exists between it and status thymicus and the lymphatic constitution.

We feel also that vagotonia is the expression of an inferior constitutional make-up. As proof of this assumption we have our findings of the frequent coincidence of vagotonia, with states undoubtedly due to constitutional inferiority of the organism.

At any event, the investigations which have been presented in the foregoing pages demand that the future yield more research upon the subject of visceral neurology.

(Concluded)

Periscope

Deutsche Zeitschrift für Nervenheilkunde

(52 Band, 1–2 Heft)

1. Investigation into Tremor and Other Pathologic Forms of Movement by Means of the String Galvanometer. BORNSTEIN and SAENGER.
2. Two Cases Presenting the Appearance of Brain Tumor, due to Tuberculosis of the Meninges, Together with Observations upon the Question of the Presence and Extension of Tuberculous Meningitis. REICHMANN.
3. The Pathogenesis of Tabes. SEPP.
4. Paroxysmal Angioneurotic Edema (Quincke). ROTH.
5. A Case of Carbon-Monoxide Poisoning. MORAWSKI.
6. Post-Hemiplegic Pseudo-Myotonia. QUENSEL.
7. A Study of the Abdominal, Cremasteric and Plantar Reflexes. HEDDE.
8. Tabes with a Strongly Positive Wassermann. (A Serological Forerunner of Taboparalysis.) KAPLAN.
9. A Study of Non-Industrial Chronic Quicksilver Poisoning. FRIEDMANN.
10. The "Compression Reaction" of Geigel.

2. Tuberculosis of the Meninges.—This writer in addition to acute hydrocephalus and serous meningitis, speaks of tuberculous meningitis as occasionally giving the clinical picture of pseudo-tumor. Two cases are reported, both with autopsy and one with a microscopic study.

3. Pathogenesis of Tabes.—In the résumé of this paper it is stated that tabes occupies a distinct nosological position and has as a basis a degenerative process with a diffusible syphilitic toxine in the cerebrospinal fluid. Although parasyphilis is spoken of, it is not in the sense of a later disease because the spirochete is present. The situation now is much like that assumed by Strümpell some time ago—that tabes is a degenerative systemic disease due to the action of a syphilitic virus.

4. Angioneurotic Edema.—This interesting article includes five illustrations showing dermographism, circumscribed edema with marginal hyperemia, edema of the legs and feet, and two others showing the reaction of the skin shortly after the use of histamin. Three tracings show (1) venous, carotid and radial pulse after vagus stimulation. (2) The interpolation of an extra-ventricular systole after the injection of adrenalin. (3) A ventricular systolic compensation pause after the injection of adrenalin.

Considerable mention is made of the work of Eppinger in which the skin is scratched but not sufficient to cause hemorrhage; then a drop of a solution of histamin is placed on the area and within a few minutes a pale spot appears and spreads over an area of about 1 or 2 mm. It reaches its maximum in four or five minutes with the appearance of a wheal and this is regarded as a genuine sign of urticaria.

5. Carbon-Monoxide Poisoning.—Here is reported a case showing a combination of three diseases—paralysis in infancy and later in life carbon-monoxide poisoning and chronic alcoholism. A child at three years had encephalitis, leaving weakness on the right side. At 16 years he began

drinking whiskey and sometimes was intoxicated several times a month. Later he was overcome by carbon-monoxide and this was followed by extensive neuritis. The drinking continued and he developed a psychosis showing disorientation as to time and place with left-sided hallucinations and persecutory delusions.

6. *Post-Hemiplegic Pseudo-Myotonia.*—Here is a report made of a most singular case seen years before. It is that of a 43 year old male who had had a peduncular hemorrhage with disability on the left side and in whom contractions of a myotonic nature always followed voluntary movements.

7. *Abdominal, Cremasteric and Plantar Reflexes.*—The material for the investigations here made included 65 cases of multiple sclerosis. The abdominal reflex was present in 13 8 10 per cent., the cremasteric in about 50 per cent. and in 25 per cent. only present on one side. The plantar reflex was present in 43 cases out of 65.

In 120 other cases including a wide range of nervous diseases, the cremasteric reflex was at variance in 38 cases and in 12 cases this was bilateral. The plantar reflex was at variance on both sides in 10 cases and on one side in 1. The abdominal reflex was usually not involved.

YAWGER (Philadelphia).

Monatsschrift für Psychiatrie und Neurologie

(Vol. 34, No. 1)

1. Experiments with Chronic Alcohol Intoxication in Rabbits. P. SCHRÖDER.
2. Disturbances of Somatic Perception in Organic Brain Diseases. H. ZINGERLE.
3. Personality Consciousness and Organic Sensibility. W. FÖRSTERLING.
4. Clinical Symptoms of Eye-Muscle Palsies, especially those of Arteriosclerotic Origin. K. SINGER.
5. A Case of Chronic Manganese Poisoning. H. SEELERT.
6. An Objective Sign of Nervous Exhaustion. O. BUMKE.

1. *Alcohol Experiments.*—Previous experiments have not had results, chiefly because they were not carried on long enough and through several generations, thus observing the effect of alcohol plus alcoholic inheritance. The author pursued his investigation for several years and through six generations. The rabbits were made intoxicated by alcohol every day, except in the case of females when it was withdrawn during gestation and lactation—otherwise the young would die. A variety of physical ailments were noted but few that were definitely due to the alcohol. Neglect of the young, failure to nurse them and killing of the new-born by the parent were common. Many became paralyzed, but this was nearly always due to spinal injury. Convulsions were no more common than among other rabbits, especially when ill. It seems evident that alcohol has little effect on the nervous system of the rabbit and that the rabbit is less susceptible to the drug than other animals, as, for instance, the dog.

2. *Disorders of Perception.*—Three cases are described, one of which is especially interesting. A man of fifty-five without syphilitic history had recurrent attacks of left-sided paralysis. There were also other evidences of organic cerebral disease. Walking was impossible without assistance. Voluntary movements with the left arm were not made so that this member seemed paralyzed. He was intelligent and coöperative in all tests involving

the right side of the body but when movements of the left side were requested he not only failed to carry them out but did not seem to comprehend what was wanted. He stared blankly and appeared not to hear. Unlike an apractic he did not make any fumbling attempts to obey. On the other hand he reacted automatically by jumping and pulling away when pricked with a pin on this side, showing that cutaneous sensibility was preserved and paralysis was not complete. On section the brain showed a slight inflammatory reaction in the meninges and a small abscess in the right frontal lobe which had broken into the ventricle. An extensive discussion of the clinical picture of " achiria " as described by Jones and of the " chiragnosia " of Rosenberg follows. The author classes his case with the latter rare affection and believes it to be produced by the organic disease.

3. *Consciousness and Sensibility.*—A contribution to this subject which has received much discussion recently. A case is cited in which the personal consciousness was greatly disturbed, not only during the acute period when consciousness was affected also with regard to surroundings, but also after the patient had become clear in the latter respect. The patient, a young woman of twenty-six, believed herself to be the devil and after recovery wrote an interesting description of her feelings while in the abnormal state. In a psychological discussion the author traces the disorder of the personality to a feeling of strangeness which the patient experiences with respect to his or her own body, which in turn is due to disorder of the " feeling tone." The patient perceives and recognizes the parts of his own body but he does not " feel " them. This word " feel " is expressive and is used frequently by these patients. The classification of the case is difficult but the weight of evidence is in favor of a constitutional psychopathic state.

4. *Eye-muscle Palsies.*—A number of cases of oculo-motor paralysis accompanying a large variety of nervous diseases is given. A further group of cases occurred in patients in whom syphilis and alcohol did not figure and in whom other nervous disorders were absent. The accompanying arteriosclerosis made it probable that this was the etiological factor and the author anticipates that a clinical variety of arteriosclerotic oculo-motor palsies will be recognized, especially when supported by anatomical proofs.

5. *Manganese Poisoning.*—Chronic manganese poisoning is a rare affection. The patient in question showed a variety of nervous symptoms the most pronounced of which was a spastic stiffness of the muscles. It gave rise to a peculiar gait. The legs were held stiff at the knees, the feet were in equino-varus position with the weight carried on the metatarsal joints. The arms were held high in the air with flexed elbows. Reflexes were greatly increased but there was never a typical Babinski sign. The pupils were unequal but reacted well. There were no psychic disturbances.

6. *Nervous Exhaustion.*—The author has devised a practical test for this condition which consists of an establishment of the ratio between the sensitiveness of the pupil-reaction to light and its electrical excitability. During exhaustion from sleeplessness, etc., a relatively much stronger galvanic current is required to produce contraction of the pupil. The diagnostic value of the sign has not been worked out and the author as yet only draws attention to its theoretical interest.

(Vol. 34. No. 2)

1. The Employment of the Abderhalden Dialysis Test in Psychiatry. H. NEUE.

2. Diagnostic Advantages and Disadvantages of the Wassermann Reaction. H. Neue and W. Vorkastner.

3. Psychogenic Pains. G. Bunnemann.

4. What Does the Effect of the Normal and Pathologically Altered Thyroid on the Nervous System Teach us for the other Internally Secreting Glands? F. K. Walter.

1. *Abderhalden Test.*—The theory of the Abderhalden reaction is briefly reviewed and the application of the test to psychoses by Fauser is discussed. The dialysis method was the one employed. The sera from twenty-six cases of dementia præcox were tested with brain-cortex, thyroid, suprarenal and sometimes liver or pancreas. The male sera were also tested with testicular extract and the female with ovarian extract. Eleven of the fourteen male cases and eight of the twelve female reacted to the genital tissues. All but three cases gave a positive reaction with brain tissue and these three were old cases which had shown no active manifestations for many years. Of fifteen cases of general paralysis all but one gave a positive reaction with brain cortex. The spinal fluid from seven of these cases was examined but gave a positive test against brain tissue in only one. This may have been due to too small a quantity of the fluid being used. Tests were also carried out with other psychoses. The author believes that Fauser and Fischer have perhaps drawn too extensive conclusions regarding the specificity of the Abderhalden test but he hopes, with them, that it has opened the way to significant advances in psychiatric diagnosis.

2. *Wassermann Reaction.*—The authors employed some of the improved methods of doing the complement-fixation test such as those of Hauptmann and of Kromayer and Trinchese. They obtained positive reaction in ninety-six per cent. of sera and ninety-five and five tenths per cent. of spinal fluids from general paresis. They claim that in one or the other of the fluids the syphilitic reaction may be found in every case if sufficient care is used. The number of cases of paresis which they report is rather small,—108.

3. *Psychogenic Pain.*—Several interesting cases of pain of psychogenic origin are given. The author believes that the occurrence of such pains is dependent upon an affective exaggeration in a certain train of thought—that processes of association and dissociation which bring the pain into consciousness are involved. The exogenous precipitating factor may be in the sphere of any of the senses. The location of the projected pain is not directly, but indirectly, or through ideation, dependent upon the exciting factor. There is no relation in form or intensity between the two.

4. *Thyroids and Nervous System.*—A review of all the evidence tends to show that all the results of thyroidectomy are secondary, by way of the nervous system. Basedow's disease is hypothyroidism rather than hyperthyroidism as generally held. In dementia præcox the glands with internal secretions are found very commonly affected but if the etiology of dementia præcox is to be sought here much work of a chemical nature must be done, for histologically it is impossible to tell which organ was primarily affected. The last organ affected may show the greatest histological changes, as is known to be the case in Basedow's disease.

(Vol. 34, No. 3)

1. A Clinical Contribution to the Subject of Paranoia. H. Berger.

2. A Serological Contribution to the Syphilis-General Paresis Question. Schoenhals.

3. A Case of Cerebellar Hypoplasia. R. KORBSCH.

1. *Paranoia.*—After discussing the views of Kraepelin and other psychiatrists the writer gives the case records of eighteen paranoiacs. From these several conclusions are drawn the most important of which is that paranoia hullucinatoria chronica and paranoia simplex chronica are one and the same. This is shown by the fact that in most of the cases the delusional state developed first and hallucinations followed later. These hallucinations in the course of time disappeared leaving the paranoic ideas still present. Paranoia is an uncommon disease, developing gradually in the latter decades of life with systematized delusion formation and with or without hallucinations. In spite of its long duration it does not lead to deterioration.

2. *Lues-Paresis.*—A study of the various serological reactions in the serum and spinal fluid of syphilitics and paretics together with observations on the effect of treatment leads to the following conclusions: (1) When an atypically negative reaction is found in metasyphilis it is almost always in old or stationary cases in which antibodies are no longer being formed. (2) The combined employment of the " four reactions " affords a method of differentiation between syphilitic and nonsyphilitic disease of the central nervous system. (3) But they do not give us essentially further aid in distinguishing paresis from lues cerebri. (4) Well-developed cases of paresis are not improved by salvarsan and are often made worse. Convulsions are a contraindication. Only very incipient cases may be treated with salvarsan. (5) In brain syphilis salvarsan has a good effect. (6) Regarding the liability of the occurrence of recidives only observations of years can add to our knowledge.

3. *Cerebellar Hypoplasia.*—In the case described the clinical history was meager. There were increased knee-jerks, tremors and choreic movements; cutaneous sensibility was intact. Autopsy showed reduction in size of the cerebellum, pons and medulla. Serial sections were taken and these are described in detail with accompanying photographs. The cerebellum loss was almost wholly in the small pyramidal layer, the Purkinje cells were fairly normal in size and number. There was definite degeneration of the posterior columns. Much space is given to a discussion of the diagnosis and the difficulty of placing the case with Marie's or Friedreich's disease. The case is an interesting anatomical study.

J. W. MOORE, Matteawan.

MISCELLANY

CALCIUM METABOLISM AFTER THYRO-PARATHYROIDECTOMY. Olaf Bergeim, F. T. Stewart and P. B. Hawk. (Journal of Experimental Medicine, Vol. XX, No. 3.)

These authors have studied the mineral metabolism in acromegaly and here turn their attention to the much more widely studied and understood relationship of calcium metabolism to the parathyroids. The metabolism of calcium was studied in a man after complete removal of the thyroid and parathyroid glands. A slight retention of calcium (0.4578 of a gram of calcium oxide in the ten-day period) was noted. The urinary calcium excretion was low, averaging 0.0134 of a gram per day on a daily ingestion averaging 1.6736 grams of calcium oxide. A slight increase was observed during the period of study in the calcium content of the blood.

No symptoms of tetany were noted in the patient, who survived opera-

tion thirty-nine days. The low urinary and blood calcium values are taken to show deficiency absorption of calcium, which may bear some relation to the decreased gastric secretion after parathyroidectomy. Attempts are made to explain the non-occurrence of tetany as due to the high calcium intake and to the development of a compensatory mechanism in which the pituitary body may play a part.

JELLIFFE.

MENDEL'S LAWS IN DEMENTIA PRÆCOX. I. Elminger (Psych-neur. Woch, October 24, 1914.)

In this interesting paper Dr. Elminger presents analyses of the schizophrenics found in one of the Swiss asylums from the standpoint of Mendelian heredity, somewhat similar to the paper presented by Oberholzer at the annual meeting of the Swiss psychiatrists in 1913. In this connection the position taken by White in his chapter on heredity among schizophrenics, White & Jelliffe's "Modern Treatment of Nervous and Mental Disease," is illuminating. Elminger comes to the conclusion that schizophrenia behaves with reference to mental health as recessive as follows: (1) The union of a sound and a sick individual gives rise to a sound progeny in which the schizophrenic constitution is latent. (2) In case both parents are heterozygote sound, the sound and the schizophrenic progeny show in a proportion of three to one as the following illustrations show:
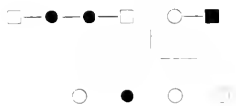
3. One parent is homozygote sound and the other schizophrenic, the children are all sound but heterozygote.

4. One parent is heterozygote sound and the other is schizophrenic, half the children are heterozygote sound and the other half schizophrenic as per the following example:

JELLIFFE.

Book Reviews

WILLIAM JAMES AND HENRI BERGSON. A Study of Contrasting Theories of Life. By H. M. Kallen, Ph.D., The University of Chicago Press, Chicago, Ill.

Dr. Kallen's carefully critical study of the works of these two great modern thinkers reveals greater diversity of thought and method than a more casual comparison might discover. Their similarity is one of tendency rather than of any detail of development. James according to his own acknowledgment received from Bergson a confirmation of his conviction of the non-logical character of reality and was moreover emboldened to announce his own anti-intellectualist standpoint. The agreement extends itself further to the function of concepts, the instrumentalism of knowledge and temporalism. Beyond these indications of general direction their methods are according to our author diametrically opposed.

Thoroughly imbued as he is with the spirit of James's work in a thorough knowledge of his philosophy, his contrast of Bergson's "transcendentalism" has led him somewhat away from a perception of the experiential nature of Bergson's thought which conceives of reality through continuous, creative action. In his conception Bergson places himself with the older philosophers, being indeed not far from Plato and the substantialism of Plotinus. Reviewing the older systems Dr. Kallen finds all philosophies united in one aim, that of apprehending our manifold and discordant experience as unreal, seeking to establish in its stead one or more of several fundamental, compensatory desiderates, denying the experience that could not be made compatible with them. In this way they arrived at an hypostasis of the instrument which thus became the end of philosophical systems rather than the immediate experience, the original object of the instrument. In this Bergson is seen to follow the ancient philosophers. His philosophy is compensatory. Discovering through radical empiricism the "spontaneity of action, hence certainty of attainment" as a modern desiderate, by dialectic he divorces reality and appearance.

Reality exists only in the *élan vital*. All the data of experience wherein we live and meet life in its multiform aspect he makes unreality, created through opposition to the vital force and diminution of it. While multiplicity arises in this unreality, unity is found in the *élan vital*. Herein is his transcendentalism. With James experience is multiform but to be taken piecemeal, acted upon as it comes, each part, be it perception, concept, whatever arises,—everything to be taken on its face value. There is a flux in all things but no underlying unity contained in it. Continuity lies in contiguousness of experience, reality in experience as we use it. Manyness in oneness is but one of the data to be met like any other. James avoids the contradiction of Bergson, distinction between appearance and reality, duration and space, spirit and matter.

Knowledge with Bergson is of two kinds, intuitional whereby we apprehend reality and intellectual in the external realm of unreality but of practical experience. According to Bergson it is true empiricism that

must by intuition place itself within reality. Any entity with James may be at once apprehended by *knowledge-of-acquaintance*, which by addition is extended into *knowledge-about*. James holds truth, moreover, to be a property of belief, a quality added to any datum of experience only if that datum proves workable. What is once true for Bergson, is true forever. It is thus that Kallen conceives of Bergson's inner duration with which we must coincide in order to experience reality.

It is somewhat difficult to see how James allows for the existence of superhuman minds. "They are admissible as evolutionary growths or as spontaneous variation," and like other parts of experience must in their own way come into contact with us. This James finds the case with religious objects, which bring us seemingly nearest to reality. But he goes on to show that gods only reside in our experience like other concepts, while this power of religious concepts comes welling up through our subliminal consciousness. It may be a power for good or for ill and must thus like other data be weighed and sifted. James still conceives that there may be something beyond the mystic which is like him, with which he can be in touch. But all this is part of piecemeal experience and must so be taken.

Bergson does not deal much with religious problems as such. Religion lies for him in the *élan vital* and all external ideas are but "symbols of a deeper thing." God is even beyond the *élan vital*, creator of matter as well as of the flux, and so beyond both. He too conceives of a possibility of a hierarchy of beings in the interpenetration of the flux.

With Bergson the good resides in the *élan vital*. Its interruption by matter is the source of evil. Therefore we realize the good in coincidence with it, in other words in our withdrawal from the external world of experience. We are individuated from this inner reality, but then again must merge our individuality in this flux in order to find the good. With James our individuality is most precious. By a determinate choosing it appropriates all to itself with that feeling of "warmness" which makes the awareness *of* a personality. This individuality is not to be disrupted, rather there is a synthesis and an integration as we act upon experience, while through persistent choosing through the individual is built up an amelioration of society, which is indeed the trend of civilization. Bergson implies a life after death, James concerns himself little with that. Man's experience is with the world. He is not one in the world as Bergson's theory puts it, a microcosm in the cosmic unity. To James the world is foreign and man must make his home in it. His success lies not in what he achieves in length of time or eternity but in the values and integrity of his character.

This little volume is written in a spirited manner and stimulates to careful thought. But in the outcome of the two methods of thought no less than in their practical dealing with experience, is there such a difference as their modes of approach would seem to indicate? In fact the psychoanalytic hypothesis shows a similarity of mode of approach which promises to be fruitful.

JELLIFFE.

THE UNCONSCIOUS. THE FUNDAMENTALS OF HUMAN PERSONALITY, NORMAL AND ABNORMAL. By Morton Prince, M.D., LL.D. The Macmillan Company, New York.

The lectures comprised in this volume are occupied with the general fundamental processes underlying all mental phenomena. While the nu-

merous illustrations employed, mostly from the author's own experience, deal largely with pathological subjects, the aim of the work is to show the processes as determining both normal and abnormal mental life in order to prepare the way to a better understanding of specific psychological, particularly psychopathological problems.

The many manifestations physiological as well as psychical, of mental activity are shown to be the result of far more extensive mechanisms than those confined to the limited area of conscious awareness. In the unconscious or subconscious countless complexes and systems of complexes organized from past experiences, perceptions, ideas with their accompanying emotions, whether they lie dormant until aroused by some exciting cause or are continuously active, arise to conscious functioning, usually only in part, or more often function entirely subconsciously and thus influence all our psychical life. This conception of subconscious conservation and activity is treated in great detail, with what would seem to be unnecessary reiteration, but this foundation is thoroughly laid for those by whom the unconscious processes and their extensive influence have not been understood. Dr. Prince gives many examples of the discovery and examination of these conserved complexes and systems with their mechanisms by artificial, technical means through automatic writing, in abstraction, hypnosis and the like. He draws much from the study of the dissociation of ideas, complexes or whole systems as witnessed in dissociated personalities.

He prefers the term subconscious, which he uses to denote all the mental life not in the actual focus of awareness, then subdividing this into coconsciousness or sphere of ideation, the unconscious contained in the physical neurograms either dormant or active, in which the past experiences are conserved, and the fringe of consciousness as it fades out of the field of awareness. This terminology he considers defines the correlated activities and states outside of consciousness more clearly than the comprehension of them all under the one term unconscious. He also uses as a basic idea the psycho-physical parallelism explaining conservation and potential functioning power through neurograms, the physical result of past experiences corresponding to subconscious and conscious mental experiences.

Several lectures deal with the subject of conflict, when certain ideas or complexes because of the effect organized with them prove antagonistic to others, the more strongly affective idea or system dominating in the field of consciousness driving the weaker it may be from it, causing varying degrees of amnesia and affecting temporarily or otherwise the sentiments, judgments, behavior of the subject, causing a dissociation perhaps of the defeated idea, complex or system, the last to the extent of a dissociation of personality. This conflict may manifest itself in consciousness or be entirely subconscious, though its effect upon the psychical life of the individual is thereby none the less important. The simple process of repression of an idea by a conflicting one, the impulsive force of the affective emotion bound with an idea or complex, the ability of the affect to detach itself from its original setting while still functioning in its emotional activity might have been explained less circuitously, nevertheless these phenomena are thoroughly examined and carefully discussed.

Dr. Prince denies to the sexual instinct a distinctive place as the fundamental force persisting with greater power than all other instincts, to many of which he would attribute sufficient power for causing mental disturbances through subconscious functioning.

The book through this detailed study affords a better valuation of the complexity of our mental life and a comprehension of its extensive mechanism through which mental phenomena shall become understood and the readjustment of the psychical life be effected whether through normal education or in the treating of pathological states.

JELLIFFE.

PSYCHOPATHOLOGY OF EVERYDAY LIFE. By Prof. Dr. Sigmund Freud. Authorized English Edition with Introduction by A. A. Brill, Ph.B., M.D. The Macmillan Co. New York, 1914.

This is a translation from the fourth German edition by Dr. Brill, who has already translated so many of Prof. Freud's writings. Dr. Brill's intimate knowledge of Prof. Freud's ideas and his extensive experience in rendering his writings into English has insured an excellent translation, while that portion of the reading public who are interested in mental phenomena are again indebted to him for making available a very important work.

The Psychopathology of Everyday Life is perhaps the most entertaining, if one may be permitted the word, of Prof. Freud's writings. It deals, as is well known, with such matters as the forgetting of names, slips of the tongue, mistakes in speech and writing, errors, symptomatic acts, and like phenomena to which all of us are more or less subject. The illustrations are simple, illuminating, and convincing, and while the study of such phenomena form the natural approach to the study of various border-line states they also form the natural introduction to the subject of psychoanalysis.

Both to the beginner and to the more advanced student of psychoanalysis this volume should prove fascinating. To the former because it guides him in a new world; to the latter because he can see the deeper meanings and more profound significance of the examples given and the principles and hypotheses outlined.

WHITE.

IRRITABILITY. A PHYSIOLOGICAL ANALYSIS OF THE GENERAL EFFECT OF STIMULI IN LIVING SUBSTANCE. By Max Verworn, M.D., Ph.D. Yale University Press. New Haven.

These lectures on Irritability were held in Yale University in 1911. They were delivered under the auspices of the Hepsa Ely Silliman Memorial.

The botanist, physiologist, zoologist, pathologist and psychologist deal daily with the results of stimulation on living matter. Stimulation is a prerequisite of existence. The interplay of various stimuli upon and within the human body produces the vital manifestations which underlie living and conduct. While it is recognized that such are not properly speaking conduct yet they are the precursors of and necessary adjuncts of conduct.

The general physiology of the nervous system is founded upon a knowledge of the special laws of nervous irritability and these are discussed in extenso in the fifth and sixth chapters of this book.

To those who have read Verworn's General Physiology, the present work will prove an added stimulus to an understanding of fundamental phenomena. To others this work will mark a period of definite departure from many old and well nigh forsaken modes of thinking.

JELLIFFE.

The Journal

OF

Nervous and Mental Disease

Original Articles

PSYCHOSES OF THE FEEBLE-MINDED

By Dr. H. Valentine Wildman, Jr.,

FORMERLY ATTENDING PHYSICIAN, CLEARING HOUSE FOR MENTAL DEFECTIVES,
AT THE NEW YORK POSTGRADUATE HOSPITAL; ASSISTANT PHYSICIAN,
MANHATTAN STATE HOSPITAL

The rare occurrence or rather the rarely reported occurrence of psychoses among mental defectives has often seemed to me to be very unusual and has suggested that they are not as infrequent as one might be led to suppose, and that the seeming paucity in that direction is due not so much to a lack of occurrence as to faulty observation and the little interest taken in this branch of work. The field of course, is not very attractive and the scope is distinctly limited, but the fact that the feeble-minded do have psychoses and that the different varieties most frequently encountered have never been very carefully described have led me to make an attempt to gather them together as well as can be done in so brief a review.

In the state hospitals there are numbers of constitutional inferiors with various psychoses. They belong to the more highly developed type of imbecile. The lower grade of imbecile or idiot does not find its way into the state hospitals but ends in the idiot asylum such as is established on Randall's Island where there are about 1,500-1,600 feeble-minded. It is in places like the

above where the greatest opportunities for the study of the psychology and psychiatry of those unfortunates present themselves. At the clearing house for mental defectives under the direction of Dr. Max G. Schlapp of this city there was also an exceptional opportunity offered of observing a great many of the weak minded. It is on my notes of cases from the above institutions that this paper is chiefly based.

There are two ways of grouping mental defectives, one according to the pathological findings at autopsy and the other according to the clinical types. As an example of the former that of Krafft-Ebing[1] is about as complete as any of which I have knowledge. He divides them into eight classes, as follows:

    1. Abnormal smallness of brain.
    2. Partial arrest of development of brain.
    3. So-called cases of porencephaly.
    4. Absence of portion of brain, e. g., pituitary gland, etc.
    5. Chronic congenital hydrocephalus.
    6. Encephalitis, focal or diffuse.
    7 Hypertrophy in toto.
    8. Remarkable increase or richness of gray matter.

While the above is a very complete and exhaustive classification, I think the following modification of Barr's[2] based on clinical types will be found more useful.

1. Idiots............
    1. Mongolian.
    2. Negroid.
    3. American Indian.
    4. Cretanoid.
    5. Hydrocephalic.
    6. Microcephalic.

This group includes individuals who are mentally under three years of age.

2. Imbeciles............
    1. Mental.
    2. Moral.

This group includes all the rest but those above 12 yrs.–14 yrs. mentally have been separated as another group.

    3. Morons.
    4. Epileptics.
    5. Psychoneurotic-hysterical individuals.

The psychology of the first group is very simple because the content of their consciousness is so very circumscribed. The idiot resembles a vegetable. He is practically devoid of affect or initiative. He will sit all day in one place, rocking back and forth, either grunting, howling or keeping mute. Memory is defective. At times he may show a transient anger but usually he is alike indifferent to kindness or the reverse. Mentally he is a baby, with a mood corresponding to that of the infant. Sometimes he may show signs of hunger and eat ravenously with the production of disgusting noises. He is usually indifferent to external stimuli, allowing flies to swarm about his eyes and mouth with no attempt to drive them away. Saliva drools from his half-closed mouth. Most of them will soil and wet themselves and have to be washed and dressed frequently. As they do not speak, it is impossible to discover their ideas but undoubtedly they are very elementary. Some of them have a vocabulary consisting of about twelve sounds with which they express pleasure, questions, disapproval and their own names. These words are helped out by gestures and by changes in facial expression, and represent a very primitive form of language similar to that in use by some of the Australian Bushmen whose conversation becomes unintelligible in the dark when the accompanying gestures and expressions are invisible.[3]

The imbecile's mind is more capable of analysis. His approximate mental age is first ascertained by the use of one of the approved intelligence tests. That devised by Binet and Simon[4] is the one used at the clearing house. His emotional and intellectual sphere is thus discovered. His concepts are those of a child. He likes to play with small children. Some are headstrong, given to stealing and lying, lazy; they play truant from school and cause an endless amount of annoyance and trouble. Others are not so troublesome but cannot get along at school. They do not seem able to concentrate their minds on anything. They are very open to suggestion and can easily be led astray. Their attitude is simple, childish, foolish and as a rule, somewhat embarrassed.

The moron is a higher grade of imbecile who can usually adapt himself to a limited degree to his environment but fails in several different ways. Either he cannot adapt his sexuality to that demanded by society and as a result has numerous

illegitimate children, or he falls a victim to alcohol or is led astray because of his susceptibility to suggestion or becomes a burden to the community because of his propensity to laziness. "Only in degree and not in nature" says Kraepelin[6] "are the mental, emotional, and volitional acts of such a patient different from those simple people whom we still regard as within the pale of sanity." They have a capacity for the practical conduct of life with a very low grade of higher mental activity which is characteristic of the congenital feeble-minded. If men, these individuals frequently become tramps, imbued with the wander-lust. They cannot remain contented in any one locality but roam from place to place until eventually their conflict with society causes them to be sequestered. If women, they change from position to position, never happy or contented for long in any one place and although they may in some instances be self-supporting for years, in the end they become public charges.

The epileptic individual after his disease is firmly rooted, acquires a characteristic facies, and he can be quite easily identified by one who has seen a number of such cases. Just what it is that stamps them as epileptics is hard to describe. They have a dull, heavy look, their features become coarsened and the expression of their eyes vacant and staring. The speech is usually slow and the tone of voice monotonous, so much so that there are some who claim they can make a diagnosis on that symptom alone.[7] Mentally they are considerably below the normal, a fact quite easily demonstrated by the use of the Binet-Simon or some allied test. A few of these patients have considerable ability along a certain line, for example piano-playing. One of the regular patients at the clearing house was an epileptic who use to play for a moving-picture theatre. But this disease cannot go on for any length of time without causing marked mental deterioration. With care and attention they may be brought up to a certain intellectual level and kept there. They can never reach the normal and if neglected they will again sink back to a lower stratum. The subject of epileptic equivalents will be considered later on when the abnormalities that are encountered in this disease are considered.

In the above we have given pictures of the average feeble-minded individual that the abnormal episodes engrafted on them may be better understood. It has been stated that insanity may

occur in infants as young as one year manifested by dullness—
incipient melancholia—or nervous excitability developing into
acute mania." The torpid thumb-sucking baby, thin, anemic, con-
stipated, whose attention can seldom be attracted and never held
is a type of the one; the screaming, restless, sleepless infant with
variable temperature, quick pulse, flushed face, wild eyes and
furred tongue, kicking and beating continually with hands or
head, of the other class." I cannot confirm this statement but I
have often seen cases where mental disease was evident at a very
early age. The chief types of mental derangement are divisible
into the following groups:

1. Amentia.
2. Manic depressive and allied states.
3. Dementia præcox and allied states.
4. Epileptic with episodes of excitement.
5. Psychoneuroses.
6. Moral insanity.

The first form is found chiefly in the lower grades of idiots
and presents no features of interest. There is no intellect, mem-
ory or affect. Many cannot even speak. The ordinary somatic
sensations are ignored. Nothing is more depressing than to see
a ward filled with these unfortunates, their faces repulsive in
their ugliness, with misshapen heads and skeletons, drooling
saliva from their open mouths, with their decayed and uneven
teeth and above all without the faintest spark of human intelli-
gence to light up their dull and staring eyes. It is these cases
which make one think most seriously about the regulation of
marriage or conception and bring up the question as to whether
certain types should not be sterilized. If the heredity of the indi-
vidual is looked into, it is found that one and frequently that
both parents were defective mentally, alcoholic or epileptic or all
three. I have seen parents bring a typical low grade idiot to the
Clearing House and found that there were one or more like him
at home. The parents are invariably defective but continue hav-
ing children for whom they cannot care and for whom the city or
state must eventually furnish support. The laws formulated by
Mendel[8] in regard to the workings of heredity hold here as well
as elsewhere and the results of improper mating cannot be escaped
except by proper supervision or curtailment of the procreative
power in certain types of individuals. And yet some of the very

low-grade idiots are geniuses in certain lines. Ireland[9] mentions one who could on being given a person's age, tell the exact number of minutes he had lived. Another could do the most exquisite carving in ivory, elaborating his own designs and thereby controverting the opinion sometimes expressed that this group cannot originate anything, yet a low grade idiot in other respects. " Blind Tom," the famous pianist, is another well-known example. He could play anything which he had once heard but would applaud himself at the end of a piece in a manner typical of the idiot. They are also subject to homicidal episodes. One boy because his companion mocked him, killed him and hid the body in a shallow stream. Another, mentioned by Esquirol,[10] a girl eleven years old, lured two small children, two and three years old respectively, to a well and then pushed them in, delighting in their struggles.

· There is one type of idiocy capable of improvement. That is the cretanoid. The cause of sporadic cretanism is, of course, the absence of the thyroid gland due to some congenital anomaly. The basic factors are as yet unknown. We will not discuss the treatment, leaving that to special treatises, except to say that if thyroid tablets are given early enough a most marvelous improvement is soon evident. I have seen one case of cretanism treated by the surgical implantation of a sheep's thyroid into the kidney. The patient is now on Randall's Island, and is a little more lively than the usual cretin. X-ray pictures show a mass resembling a stone in the kidney operated on and the gland has apparently been infiltrated with lime salts. He has also developed a pyonephrosis in the kidney which gives occasional severe rises of temperature. The result taken as a whole is distinctly unsatisfactory.

Manic-depressive states and allied conditions are evident among the feeble-minded more as an unstable emotional state than as a frank attack except in those constitutional inferior individuals so frequently seen in the state hospitals. The course and varieties are then the same as that among the constitutionally normal. The prognosis is favorable as regards the attacks but they are more liable to deteriorate and of course never reach the status of a normal person. Their ideas are usually of a nonsexual nature, disguised perhaps by the use of symbols, a mechanism which Freud[11] has demonstrated, and with episodes of mature type. Indeed it has been demonstrated that cases of stupor showing

the above complex are always benign, whereas those showing the reverse, *i. e.,* sexual ideas with infantile trend are malignant and do not recover. Any outline of psychiatry will give a good description of the typical manic-depressive states and they do not interest us to such an extent as some of the other varieties of psychoses.

The reason for grouping many of the feeble-minded insane under the class of dementia præcox is evident to one who has seen any of these cases. Their attitude is indifferent, they pay little attention to the environment and show marked diminution of the affect. The chief reason for so grouping them is their inaccessibility and their mannerisms. One cannot tell what they are thinking about and still they may be pretty well preserved. A short time ago I had the opportunity of seeing a microcephalic imbecile with præcox-like actions. Nothing could be obtained from her. During her stay at the institution it became necessary to do a lumbar puncture. This was sufficient to cause her to break her reserve and it was seen that this person, apparently oblivious to her surrounding, was quite well oriented and had a good memory. In what way the deterioration of a mental defective differs from that of a normal individual is hard to discover. Frequently their language even when they do speak is quite unintelligible because of their use of " contaminations " or word condensations,[12] thereby forming a language of their own. This is the " word-salad " mentioned by the Germans and accounts for the apparently nonsensical statements of the præcox.

The so-called moral imbeciles are very frequently encountered. They include all ages but most frequently the age lies between eight and eighteen years. The importance of this type of case lies chiefly in the province of forensic medicine. The sufferers are medically insane but not so legally, due to the difference between the medical and legal definitions of insanity. The law says that an insane individual is one who does not know the nature and quality of his act. It is the above discrepancy that is so confusing to the laity. Many patients who come under this group are incorrigible boys. One boy I saw, used to set fires whenever he had the opportunity and no amount of punishment could break him of this habit. Even when confined in an institution his pyromania would break out and the only adequate method of treatment was constant supervision and vigilance.

FAMILY TREE WORKED OUT BY IRELAND SHOWING INFLUENCE OF HEREDITY

Quoted by Clouston

John Whaup, sober, intelligent, but with insane or peculiar collateral relatives

1. Euphemia = Geo. Scart (dissolute) (weakminded)

2. Margaret (unmarried imbecile)

3. Thomas (imbecile)

1. Margaret (imbecile)

Two illegitimate children

2. Isabella

One illegitimate child

3. Son (slightly imbecile)

4. Robert (imbecile)

1. Janet = C. Cailzie

2. Christina

Two illegitimate children

3. Thomas

4. Mary (unmarried field worker)

5. Adam (imbecile)

6. John (imbecile)

7. Alexander

8. James (imbecile)

9. Robert (lunatic)

Sons and daughters, some of them imbeciles

1. T. Norris (imbecile)

2. G. Scart (imbecile) Convicted of sexual offense

3, 4, 5 sane

Many girls in this class have no idea of sexual responsibility and if left at large, will bear an illegitimate child every year with no more compunction about it than they would feel about drinking a cup of tea. As an example, one of these girls escaped from an institution and met a couple of young men on the country road where she was walking. They took her to a nearby field, had intercourse with her and then returned her to the institution collecting the ten dollars, the standing reward offered for the return of escaped patients. The girl made no mention of her sexual experience until some time later. Others are unable to resist imbibition of alcohol and still others are so susceptible to suggestion that they become cat's paws for others and end in the penitentiaries. These unfortunates differ from many whom we are forced to consider as sane only in degree and had they not come into conflict with the criminal law, might still be enjoying their liberty.

Their attitude when examined is quite characteristic. They are surly, reply in a sullen way to questions relative to their offense and will deny the accusation. Another type will admit the charge against them but will attempt to justify themselves and at times become so plausible that in the absence of proof, the examiner would be in doubt as to the correctness of the accusation. These patients all have a poor heredity. The appalling genealogical tree which Clouston[13] quotes is an example of the lengths to which it may lead.

The epileptic, usually dangerous to no one but himself, becomes during his episodes of excitement one of the most dangerous individuals. The episodes may precede, follow or replace a convulsive attack. As a rule the patient is amnesic for the events taking place while he is in the above states and can give no account of anything that has happened. Most of these cases are in institutions for those with criminal tendencies and my own experience covers only a few cases. Among the youthful epileptics the occurrence of a psychosis was the exception, the most prominent features were the characteristc facies and the mental deterioration which they underwent. The case of one little girl is instructive. She was twelve years old and had had convulsions for about one year. She had a peculiar trend, the basis of which was that she wanted to be a mother. She would ask to be given a baby, talked about how she would care for it and give a fair description of the birth of a child saying it came from the mother's

side. How dangerous such a state of mind might be if the child
had been allowed to go about unwatched is easily seen. The
outcome of such a case is doubtful. Whether she will get over
her ideas or whether they will become more firmly rooted only
time can tell.

We do not have to go to the institutions for the feeble-minded
to find the subjects of psychoneuroses. As they are very fre-
quently superimposed upon a neuropathic makeup, so they are often
added to those whose central nervous systems show a constitu-
tional defect. The phenomena of hysteria are protean and not-
withstanding the fact that nothing is easier to detect, many cases
are considered as epilepsy or some allied condition. Patients with
the hysterical diathesis, so to speak, will, like the epileptic, deteri-
orate if the condition is not diagnosed and proper treatment begun.
They are the subjects who have been so greatly helped in many
instances by psychoanalysis. The original psychic trauma which is
repressed and deeply buried in the subconscious stream of thought,
can frequently be brought to light and discovered to the patient
who is often cured by having the true etiological factor shown
and explained to him. Two cases, interesting because of their
etiology will be mentioned here. They both date from a dog-
bite. One a girl nineteen years old, definitely feeble-minded, was
bitten by a dog two years ago. Since that time she has been kept
in the hospital ward at Randall's Island because of her frequent
convulsive attacks. The attacks are made up of tonic followed
by clonic convulsions during which the patient barks like a dog.
The attacks in this case were cut short by the application of aro-
matic spirits. That procedure had never been tried before, but
apparently has cured the patient. She showed the characteristic
areas of anesthesia, the pharynx and cornea being insensible to
touch. She was not accessible to psychoanalysis but the attacks
were undoubtedly based on the deep-seated fear arising from the
bite. Another case which I have just recently seen is that of a
veterinary nurse, who after working with animals for a year or
so was bitten by a dog said to be rabid under circumstances caus-
ing a profound mental shock. Since that time she has had fre-
quent convulsive seizures, during which she bites her tongue and
arms. A partial analysis revealed a repressed fear of rabies but
she is not now accessible for further examination. She also has
areas of anesthesia and has deteriorated mentally so that she acts

like a child of nine or ten years. In these two cases the cause is self-evident but in many it is deeply hidden and repeated analyses may fail to disclose it.

Thus we have in the briefest possible way outlined the various kinds of mental disease which are found in the feeble-minded. The fact that they do have psychoses similar in nature but differing in degree, from those which afflict individuals considered normal, has, I think, been somewhat neglected. There is yet room for a large amount of work to be done in analyzing and classifying the various groups, and in determining just how the deteriorations of the defective differ from those of the normal individual. So far as my observation goes the difference is one of degree. Their ideas, whether hallucinatory or not, are never very elaborate because the material they have to draw on is limited. The prognosis of any psychosis in the group considered is unfavorable and heredity plays a much more prominent part than elsewhere.

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MENTAL DISEASE AND LANGUAGE

By Wm. McDonald, Jr., A.M., M.D.

II

The Child's Vocabulary

The development of verbal expression in the child is of especial interest to the student of mental disease, since the laws for the acquirement of language might be expected to have some relation to its loss.

Other factors being equal, the words first learned, while the mind is in the highest degree receptive, should prove to be the most fundamental and the most permanent, both by reason of duration of existence and firmness of establishment.

Likewise, the frequency of repetition and the extent of association of words with other verbal memories and sensory images should receive careful consideration in any attempt to explain the loss of vocabulary.

For example, the word *mamma*, having been learned first of all and repeated innumerable times, might be regarded as the one word above all others likely to be retained to the last in a disease capable of gradually obliterating the mental images and processes. The same expectation might be applied to a large number of the simple substantives which play so large a part in childish prattle.

A single word expressive of motion, however, by reason of its associations may be more liable to re-arousal than any one of several substantives perhaps earlier established. Thus, the word *go* might exist as the only verb in the child's vocabulary, with perhaps a dozen or more substantives, and yet, by reason of its possible association with every one of those substantives, be the most permanently fixed and the most easily aroused. Thus many different words may be used in combination with a single verb; as

Mamma			away.
Papa			out.
Light	} gone {	home.
Milk			upstairs.
Baby			on the cars.

In the same way the article *the* or *a* or the adjective *good* or the adverb *soon* might well be better established than a substantive of earlier adoption.

The character and intensity of the emotional coloring accompanying the impression and first expression of a word, the degree of interest aroused and of desire seeking satisfaction, the relation of the verbal symbol to primary instinct: all these must be considered with other psychological laws in the endeavor to estimate the probable fixity and permanence of verbal images.

But however and whenever acquired there can be no doubt that a knowledge of the way in which a child learns to talk is essential to a proper understanding of a loss of language.

W. Preyer[1] has reversed this proposition and has made use of adult speech disturbance in his excellent studies in speech formation . He says, " What organic conditions are required for the imitation of sounds and for learning to speak I have endeavored to ascertain by means of a systematic collection, resting on the best pathological investigations, of all the disturbances of speech thus far observed in adults ; and the daily observation of a sound child, . . .has brought me to the following important result : *That every known form of disturbance of speech in adults finds its perfect counterpart in the child that is learning to speak.*" In the present studies, while the converse of Preyer's methods has been used, it should be remembered that the analysis has been limited— so far as possible—to the expressive features of language as distinguished from speech understanding. It is of course admitted that long before the child speaks intelligently he understands spoken language to a considerable degree, and it is likewise acknowledged that, in the majority of cases, some comprehension of language persists when the ability to express has been lost. The study of language acquirement and loss is so broad that one aspect alone —the expressive function—affords sufficient opportunity for these investigations.

The First Word.—The age at which the first word may be expected to appear and the character of that word are matters of intense interest to scientists as well as to the mother and family. There are wide differences in children, and observers give varying opinions as to the average normal age at which the first word is spoken. Failure on the part of observers to distinguish between mere imitative reproduction without understanding and

the first intelligent use of a word, is partly responsible for the lack of unanimity in testimony on this point.

Tracy[2] says that a few words are spoken without understanding in the second six months of life, and that though a few words may be spoken understandingly—as *papa* or *mamma*—most children have no vocabulary in this period.

One child of 9 months is reported as speaking 9 words plainly though the words are not given, and another child of 12 months is said to have used 10 words with meaning.

Major[3] says that before the end of the first year the child uses uniformly a small number of sounds or words to express wishes, facts and ideas.

Dr. Paul Maas[4] gives the 12th month as the beginning period of active speech but the 15th month as the average time of appearance of intelligent verbal expression.

The babies of my own acquaintance whose mothers have assisted me in these studies, varied greatly as to the date of the first intelligent verbal expression. One used his first word when 8 months old, while his sister reached the 11th month before a word was employed with meaning. Other children scarcely spoke at all until walking had been mastered in the 20th and 21st month. The 15th month is probably correctly given as the average time for the first use of words with meaning.

While the age at which the first word appeared is, for our purposes, of minor importance, the character and significance of that word deserve closest attention.

So many writers have laid stress upon the occurrence of the first words as simple designations of objects and upon the overwhelming preponderance of nouns in the child's vocabulary, we might be led to regard the noun as the most fundamental element of speech and thus be brought to confusion when, in considering the pathological loss of speech, it is found that nouns are the first to be forgotten and lost.

Disregarding for the moment the published records of children's vocabularies, note the first intelligent spoken word of each of the six children under two years of age who enter into my own analyses.

Gone, bye-bye, drop, (dropped), how-de (how do you do), hello, take are the first words used respectively by each of the six.

Is it not significant that these are all words expressive of a *situation* or *motion* and not designations for objects?

What the particular word first spoken may be depends, of course, largely upon what the child hears, what it is taught, the emotional experience accompanying verbal impressions, the ease with which various sounds are made, and upon other more or less accidental factors; but it must be evident to every one who has closely observed the child beginning to talk that these first words of active speech are exclamatory desire words, expressions of emotion, of interest, of instinct and of volition, even though a certain number of them happen to designate some object to the adult mind.

Extent of the Child's Vocabulary.—The number of different words at the child's command at various ages has been estimated by many authors.

M. C. and H. Gale[5] counted the different words used in one day by a boy and a girl each $2\frac{1}{2}$ years old. It was impossible to record each word, but 751 and 629 different words in a total of 9,290 and 8,992 used by the boy and girl respectively were counted. Up to $2\frac{1}{2}$ years 1,432 different words were used by the boy and 1,300 by the girl, each using therefore in one day about one-half of the total vocabulary.

A girl of 20 months used 80 different words in a day—about 96 per cent. of her total vocabulary.

These authors consider Tracy's estimated average vocabulary of a child of 2 years (257 different words) as only one-half to one-third of the correct amount.

Unless a child is under constant observation, it is impossible to form an accurate estimate of the number of words used over a prolonged period, and my own records contain but one example of a faithful attempt to record the vocabulary of a child under 2 years of age. One average girl up to her 21st month had used 162 different words: this is probably considerably under the actual number.

I have, however, accurate stenographic records of the number of different words in a total of 500, used by each of 10 children of ages varying from 26 months to 5 years and 5 months. The average number of different words was 170.2, the largest number 202 and the smallest 117.

From the second year the vocabulary increases in direct ratio

with the age, though even the oldest child has a vocabulary still far below the average adult. The average child of this period has a vocabulary of about three fourths that of the average adult.

Table of Different Words used in 500 Consecutive Words

Child	Age	
G. C.	4 years 5 months	202
E. S.	5 years 5 months	197
N. R.	5 years 3 months	189
B. M.	4 years 6 months	187
C. W.	4 years 5 months	182
N. D.	5 years	174
H. F.	4 years 2½ months	170
M. S.	3 years 2 months	149
B. D.	2 years 3 months	135
N. S.	2 years 3 months	117
		1,702

Professor Launé[6] is, therefore, inaccurate when he says that up to the 8th year the child's range of language is very small and that he probably confines himself to not more than 150 words.

The Parts of Speech. Nouns and Verbs.—Unquestionably nouns make up a larger part of the young child's *vocabulary* than does any other part of speech, but this should not be taken to mean that the total number of nouns *used* exceeds the total number of verbs, a mistake too frequently made by writers on this subject.

Of the *different* words spoken by children under 2 years, of my own acquaintance, 62 per cent. were nouns. In the 5,000 consecutive words recorded stenographically, from 10 children between 2 and 5 years, 1,702 different words were used of which 572 (33.6 per cent.) were nouns, the total number of nouns used being 1,053.

Compared with adults it may be seen that the average child between 2 and 5 uses a smaller total number of nouns (in 5,000 words the children used 1,053, adults 1,088 nouns) and a smaller number of different nouns (the average per child being 57.2 different nouns in 500 words, vs. 73.1 per adult); but the same figures show that nouns compose 33.6 per cent. of the child's vocabulary and 21.4 per cent. of the adult's.

Turning to the verbs, the studies show that the ten children used 1,178 verbs in 5,000 words, while the adults used but 978. The adults, however, used a larger number of different verbs. (Average per adult 48.8 different verbs in 500 consecutive words vs. 42.2 per child.)

Therefore, in the vocabulary of the average child between 2 and 5 years, verbs compose 24.7 per cent. of the vocabulary, whereas they compose but 14.3 per cent. of the average adult vocabulary.

The following table will show at a glance the remarkable reversal which takes place in the comparative use of nouns and verbs as the child becomes adult:

	Diff Words in 5,000	Nouns Total No.	Verbs Total No.	Diff. Nouns Av. Per Subj.	Diff. Verbs Av. Per Subj.	Nouns Per Cent. in Vocabulary	Verbs Per Cent. in Vocabulary
10 Norm. Adults speaking ea. 500 words, used....	3,404	1,088	978	73.1	48.8	21.4	14.3
10 Norm. children speaking ea. 500 words, used....	1,702	1,053	1,178	57.2	42.2	33.6	24.7

Nouns and verbs, therefore, make up 58.3 per cent. of the child's vocabulary and but 35.7 per cent. of the adult's.

Tracy,[2] adding the vocabularies of a number of children observed by himself and by others, finds that in 5,400 words 60 per cent. were nouns. He says that this would make it appear that the nouns have the advantage, " but such a conclusion obviously cannot be drawn unless a comparison of the child's vocabulary with that of the adult justifies us in so doing. In order to show that the child learns nouns more easily than verbs, we must be able to show that the number of nouns bears a larger proportion to the number of nouns he will use as an adult than the number of verbs bears to the numbers of verbs he will use in adult life.

" Let n = the proportion of nouns in the child's vocabulary,

Let N = the proportion of nouns in the man's vocabulary,

Let v = the proportion of verbs in the child's vocabulary,

Let V = the proportion of verbs in the man's vocabulary.

" Then if the child learns nouns more easily than verbs, the proportion of n to N will be greater than that of v to V. But on comparing the two tables, the very opposite is found to be the case.

"For

$$\frac{n}{N} = \frac{60}{60} = 1.$$

"But

$$\frac{v}{V} - \frac{20}{11} = 1.81 +.$$

" In other words, the child of 2 years has made nearly twice as much progress in learning to use nouns—according to my tables of child language and Professor Kirkpatrick's table of adult language—to my mind, this fact . . . possesses great value for philology and pedagogy, as well as for psychology. In the first place it supports the view that the acquisition of language in the individual and in the race proceeds by similar stages and along similar lines. Max Miller says that the primitive Sancrit roots of the Indo-Germanic languages all represent *actions* and not *objects*."

He thus concludes that " the ideas which are of greatest importance in the infant mind and so clothe themselves most frequently (relatively), in words, are the ideas of *actions* and not *objects*, of *doing* instead of *being*. The child learns to use *action-words* (verbs) more readily than *object-words* (nouns) ; and words descriptive of actions (adverbs), more readily than words descriptive of objects (adjectives.)"

It seems to me, however, that the terms of Tracy's proportion cannot properly be compared. Kirkpatrick's table refers, I take it, to the whole number of nouns and verbs in the English language, not the proportion actually used by any single adult. It means simply that there are in existence more names for objects than names for actions, but does not indicate the proportion of either of which the ordinary adult makes use.

To make the tables comparable, the whole number of words used by all 2-year old English children of all times should be substituted for the limited vocabularies of the twenty-five children of Tracy's text. Or, the ratio which the number of nouns or verbs used by the average adult bears to the whole number in the English language, could be compared with the ratio between the number used by the average child of 2 years and the total number used by all 2-year old children of all times. Of course, such a comparison cannot be made since it is impossible to determine the limits of child language.

A true proportion could, however, be made somewhat after Tracy's method by using the two series of 5,000 words which I have recorded stenographically from children and from adults.

Thus

Let $X =$ per cent. of different nouns used by adults in 5,000 words,

Let n = per cent. of different nouns used by children in 5,000 words,

Let V = per cent. of different verbs used by adults in 5,000 words,

Let v = per cent. of different verbs used by children in 5,000 words.

Then

$$\frac{n}{N} = \frac{33.6}{21.4} = 1.57 +,$$

$$\frac{v}{V} = \frac{24.7}{14.3} = 1.72 +.$$

The conclusions, therefore, verify Tracy's statement that children make more relative progress in learning verbs than in learning nouns.

Moreover, it may be readily seen that as the child uses a smaller number of different verbs than different nouns, but uses the verbs much oftener than the nouns, the verbs—other things being equal—will become more firmly fixed, and moreover, will have a larger number of associations and can thus be more easily aroused to memory. The verb is thus a more fundamental part of speech than the noun.

The particular words most used by children reveal the influence of environment and the part played by egoistic interest and desires in the prompting to verbal expression.

Among the nouns, *mamma, mother* and *ma* take first rank, while *papa, dada* or *daddy* and *father* occur next in order of frequency. In my own cases proper nouns occurred with equal frequency among adults and children.

Some authors (see M. C. & H. Gale[5]) mention *want* as the most frequently used verb; my records give *do* and *don't* the highest place, while *got, go, have, see, look* and *want* follow in the order given.

Adjectives.—The 10 children from 2 to 5 years of age used 314 adjectives, about half the number used by the 10 adults (619). The youngest child used 8, the oldest 51, while the others used a number very nearly proportionate to the age.

The size of the adjective vocabulary increased almost uniformly with the age. No child used as many different adjectives

as the smallest number used by an adult. As compared with adults, the children used a smaller number of adjectives, a smaller variety and even a smaller variety proportional to the total number used. The favorite adjectives were *that, little, this, big, old* and *funny* in the order given.

Prepositions.—All authors state that the preposition appears late. Preyer[1] did not hear it until the 28th month with his child. I have observed it in the 23d month, though it certainly is not frequent before this time.

A child of 25 months used 39 prepositions in 500 words, while another of 5 years and 5 months used but 30. The average child between these ages uses about 2/3 the number used by the average adult and 3 4 the variety.

The preposition *in* occurs twice as often as any other preposition and almost as often as all the others together.

Articles.—Before the second year the article is exceedingly rare. Thereafter it occurs with increasing frequency. A child of 25 months used it 22 times in 500 consecutive words, while a girl of 29 months used it more often than did any other child or adult. The average use between the 2d and 5th year is nearly as large as in adult life.

A peculiarity of the children was the rarity of the indefinite article *an.* Only 2 children used it; whereas, every adult but one made use of it.

Preyer[1] found that in the 28th month and even in the following months the definite article appeared almost solely; in my records it is otherwise, for *a* appeared 156 times and *the* 144 times in 5,000 words. This contrasts with the adults since these used the definite article more often (*the* 187, *a* 111).

Pronouns.—The use of the pronoun is one of the most interesting features of the child's speech. The 10 children whose words were taken down stenographically used 999 pronouns in 5,000 consecutive words, practically a third more than were used by adults (700 used by adults). Moreover, the younger children of the series used more pronouns than the older ones, and the oldest child used the fewest. This is significant if it be remembered that with the adults the use of pronouns decreased almost exactly in direct proportion with the degree of culture of the individual.

Most surprising is the fact that the children actually averaged a greater variety of pronouns (16.2 different pronouns in 500

words vs. 14.2 used by adults), though, of course, the variety in proportion to the total usage is much less than with adults.

These data are all the more astonishing when it is found that other observers are mostly agreed that the pronoun is a comparatively late acquirement.

In the cases tabulated by Tracy[2] no pronoun appears before the 21st month. Major[3] was not sure that any pronouns other than *I, it, itself* and *himself* appeared before the 4th year of the child *R*. He says that the relative and interrogatives did not appear until after the period under review (end of 3d year). He heard *I* a dozen times in the latter part of *R*'s 3d year.

Nevertheless, I note that in the records of M. C. and H. Gale, a boy of 2½ years used 27 different pronouns and a total number of 678 pronouns in 9,290 words, while a girl of the same age used 15 different pronouns and a total of 761 pronouns in 8,992 words.

These figures, with my own stenographic records, leave little doubt that carelessness of observation explains the absence of pronouns in the records of other writers. I have three records of children under 2 years of age, all of whom used pronouns. In one the pronoun *that* was distinctly heard in the 19th month, while in the other two *I* and *it* were recorded in the 21st month.

Probably no great use is made of the pronoun before the second year, when it suddenly appears to great excess, bearing the brunt of the child's lack of familiarity with particular names, only to recede into the background as the child's knowledge becomes more specialized.

It is interesting to note that in 5,000 words *I* appeared but 213 times, against 318 times in the same number of words from normal adults.

Particular attention should be given to the excessive use of the pronouns *it* and *that* (used 153 and 114 times respectively, in 5,000 words vs. 32 and 32 times in the 5,000 words of adults). As convenient substitutes for unremembered names they will be found again in excess with the aphasics and those whose power over language is waning.

Adverbs.—Most writers underrate the use which the child makes of the adverb. In my experience it appears early—frequently in the 16th month—and from the close of the 2d year adverbs compose a considerable, though decreasing, portion of the speech. A child of 26 months used, for example, 67 adverbs in

500 words and the 10 children used 554 adverbs in 5,000. They far out-number the adjectives. The variety of adverbs is, however, much smaller than with adults, especially in proportion with the larger number used. (Average, 21 different adverbs per child.)

These figures are quite in agreement with the records of M. C. and H. Gale, whose studies in general seem to have been most carefully pursued. (The Gale records of two 2½ year old children give 2,345 adverbs in 18,282 words and a vocabulary of 42 and 38 adverbs respectively.) As Maas[4] and others have noted, adverbs of time appear much later than adverbs of place.

The adverb *there* is usually the first to appear and remains the favorite, outnumbering any other single adverb (58 times in 5,000 words). The word *there*, of course, is used as an exclamation very early, but it is considered in this place only when the adverbial sense has become definite.

Yes and *no* occur three times as often in the records of children compared with those of adults. *Up, down, out* and *here* occur next in order of frequency, in the order given, and are followed by *where, when* and *then.*

Conjunctions and Sentence Building.—No other part of speech is so conspicuous by reason of its rarity in early childhood as the conjunction. The earliest recorded appearance which I have is in the 26th month where it was used but once in 500 consecutive words, and even then apparently in quotation. It was heard distinctly in the 27th month (also but once in 500 words), and then as a simple connection between two substantives. As a connection between clauses and sentences it occurred first in my records from a girl of 3 years and 2 months. Tracy reports the conjunction in the 23d month but not again until the 27th month. In Major's[3] records it has not yet appeared at the end of the 3d year.

Its use increases almost directly with the age, as does also the variety of conjunctions. Not until adult life is there that play of judgment and reason which, with finer distinctions of cause and effect and association, demand appropriate logical combination in forms of expression.

The conjunction represents, therefore, one of the highest forms of verbal acquisition.

In the 5,000 words of 10 children between the ages of 2 and

5½ years, it occurred but 172 times as compared with 229 times in the same number of adult words.

An average of 3.6 different conjunctions were used by each child, next to the oldest child using 8. By all 10 children actually 12 different conjunctions were used. The simple conjunction *and* was most used (125 times), followed by *because* (14), *but* (10), *or* (8), *then* (4).

Interjections.—Exclamations occurred almost three times as often with the children as with the adults (68 times in 5,000 words) and there is probably no rule as to the age of appearance. They often are the first actual words spoken.

Relation of the Different Parts of Speech to Each Other.—The order of frequency of the different parts of speech in 5,000 words from 10 children of ages between 2 and 3½ years is shown in the following table.

		Per Cent.
Verbs	1,178	23.56
Nouns	1,053	21.06
Pronouns	999	19.98
Adverbs	534	11.08
Prepositions	356	7.12
Adjectives	314	6.28
Articles	306	6.12
Conjunctions	172	3.44
Interjections	78	1.36
	5,000	100.00

The average variety of words per child in each part of speech was as follows:

Nouns	57.2
Verbs	42.2
Adverbs	21.0
Adjectives	17.2
Pronouns	16.2
Prepositions	9.7
Conjunctions	3.6
Interjections	1.9
Articles	.3
	169.3

The following table represents a rough estimation of the average number of repetitions of a given word in each part of speech in 5,000 consecutive words:

Articles	102.	repetitions
Pronouns	6.16	repetitions
Conjunctions	4.41	repetitions
Prepositions	3.67	repetitions
Interjections	3.56	repetitions

Verbs	2.79 repetitions
Adverbs	2.63 repetitions
Nouns	1.83 repetitions
Adjectives	1.82 repetitions

The verbs, pronouns, adverbs, conjunctions and interjections in 5,000 words numbered 2,971. The nouns, adjectives, prepositions and articles numbered 2,029.

III

The Morbid Vocabulary

Following the study of the speech of children and of normal adults, a comparative investigation of the verbal expressions of persons with mental derangement is intensely interesting. The same general plan has been carried out with the abnormal cases as with the normal adults and children; namely, the careful recording of a series of consecutive words from a considerable number of subjects, the abnormal cases being arranged in groups according to diagnosis and analysis of the stenographic notes.

The work is far from complete, and one must be constantly on guard against the temptation to draw deductions from insufficient data.

5,000 words from 10 classical dementia præcox cases, 5,000 from 10 mania-melancholia cases and nearly 10,000 from unquestionable cases of gross organic brain lesion have already been analyzed, as well as a considerable number from cases of senile and paretic dementia.

Unfortunately the observations on the last two mentioned groups have not been completed in time to permit of analyses and incorporation with the present studies. The senile cases are especially essential since they represent transitional stages between the great group of so-called inorganic psychoses and that composed of cases with mental derangement dependent upon gross organic lesions presenting speech disturbances of a grave and striking character.

The series of vocabularies from the cases of dementia præcox and mania-melancholia have been completed and the analyses worked out. The results are interesting in their deviation from the normal, and particularly when compared with the vocabularies of children. The significance of these variations, however, is not sufficiently evident to warrant positive conclusions without study

of additional cases, and, moreover, tentative deductions of a theoretical nature would carry this monograph beyond the limits of practicality. Discussions of these two groups, therefore, may well be reserved for a later contribution.

Meanwhile, twenty patients with serious brain injury have been selected as subjects for the study of verbal expression as affected by various lesions. These lesions include cases of brain tumor, fracture of the skull, cerebral hemorrhage, embolism and thrombosis, a number of which have been identified by final post-mortem examination and the remainder having revealed themselves definitely in history and symptoms.

The 20 patients have been arranged in a series at one end of which are those with greatest speech defect, represented by absolute anarthria, and at the other end those whose symptoms— perhaps a slight paralysis, for example—barely differentiate them from cases of simple senile dementia.

The whole series has again been subdivided into two groups, one made up of those cases so severely disordered that 500 consecutive words could not be obtained from each patient, the other group containing the patients able to furnish at least 500 consecutive words.

Group I.—Those from whom 500 consecutive words could not be obtained.

It will not be necessary to describe in detail these 10 patients; the purpose of the paper will be sufficiently served by a brief outline of certain cases.

Case I.—B. B. Male. Armenian. Age 38. Right handed. Has a right hemiparesis. Understands very well when spoken to in English, German, Syrian or Zanzibar. The last two languages his wife says he comprehends as well as he ever did. When spoken to in either the German or English (the latest acquired tongues) he certainly responds very readily. Points out objects named, points correctly to numbers mentioned, selects colors named, buttons his garment on request, etc. Has a bright, intelligent expression, is orderly and perfectly rational in conduct, and, judging from his lively expression, his responsive grunts and signs of assent and dissent, seems to follow understandingly the general substance of ordinary conversation. Knows when the time given by the clock is correctly expressed. Likewise understands written speech to a considerable though limited extent. Recognizes about 50 per cent. of written words and even short sentences, though fails to grasp certain of the words. Writes

with the left hand; writes his name spontaneously, and on request writes the name of the city in which he lives. Asked to write his address (10 Buffom St.), writes "*10 B——*" then "*10 Paw-tucket*" (lives in Pawtucket). Copies very well.

When, however, the speech is investigated, it is found that he can say absolutely nothing, either spontaneously or in repetition. Moreover, cannot perform on request or in imitation any express-ive act with the muscles of the face, lips, tongue, pharynx or larynx. Can smile, cough or whistle reflexly or perhaps even spontaneously, but when he attempts to repeat a sound or imitate a posture of the lips, he almost invariably performs the wrong action though he appreciates his failures and apparently compre-hends perfectly what he has been requested to do. The sound *M* is practically the only sound which he succeeds in imitating, and never at any time was there any approach to a word expressed either spontaneously, on request or in imitation. In short, with remarkably well preserved—though not perfect—comprehension of spoken speech, *he has complete anarthria.*

CASE II.—L. G. Female. Age 40. German. Right handed. Almost complete right hemiplegia. Very bright and intelligent. Understands English, French and German. She comprehends even complicated sentences, though comprehension of spoken speech is not entirely normal. Gets confused easily.

The case is almost identical in symptoms with Case I, except that in place of absolute speechlessness she can say two words, *ice-cream* and *one*, and occasionally used the word *nein*. She can, however, sing correctly. She can make sounds but cannot articulate. She can protrude the tongue, show her teeth, and ap-parently uses most, if not all, of the muscles required for speech. The words that she uses are not spoken in a way to indicate that incoördination is the cause of her speechlessness. Her spoken vocabulary is limited to two, or at most, three words.

CASE III.—G. P. Left hemiplegia in a left-handed man, with very marked word deafness but a vocabulary consisting of 101 words, of which 11 are nouns, 22 are verbs, 27 are adverbs and 16 adjectives.

CASE IV.—J. S. Huge brain tumor, (found post mortem), largely left sided, in a right-handed man.

Here the vocabulary consists of 133 words, of which 23 are nouns and 28 are verbs. He used these nouns 41 times while he was using the verbs 82 times.

CASE V.—J. B. Brain tumor, (found post mortem) largely left sided, in a right-handed woman. Vocabulary 150 words, consisting of 28 nouns, 41 verbs, 23 adjectives and 32 adverbs.

It may be seen from these examples that there are various de-grees of loss of vocabulary from wordlessness to the preservation of a word treasury sufficient for the purposes of intelligent con-versation.

There are cases with a still larger vocabulary whose word comprehension is limited and who are unintelligent and silly.

In other words, the degree of loss of a speaking vocabulary bears no constant relation to the degree of intelligence and word understanding. Moreover, there are characteristic features to the loss of vocabulary, the verb-adverb class of preserved words largely outnumbering in variety and exceeding in usage the noun-adjective class.

These features become even more definite when a group of cases is analyzed in which the speech possibilities are of sufficient extent to warrant the striking of averages.

Group II. Those from whom 500 consecutive words could be obtained.

In 5,000 words spoken by 10 subjects an average of 164.3 different words was used by each person, an average considerably less than that of the normal child between the ages of 2 and 5 years (170.2), and far below the normal adult average. Indeed, the largest vocabulary possessed by a diseased person was lower than the smallest normal vocabulary.

Nouns.—Consideration of the nouns used by the 10 persons must impress one deeply with the importance of studies of this character. Here we are met with facts of the greatest significance —facts which command attention as tokens of a vast field of unexplored mental activity. Why in these 5,000 words are there but 642 nouns, whereas 10 normal adults used 1,088 nouns in the same number of words and 10 normal children used 1,053? An adequate answer to this question will greatly extend our knowledge of normal and abnormal mental processes.

The variety of nouns used is particularly interesting. An average of 37.3 different nouns per person contrasts remarkably with the average of 73.1 of the normal adult and with the 57.2 of the normal child. All but one used a smaller variety of nouns than that of any normal adult, and six had a smaller vocabulary of nouns than any child between 2 and 5 years of age.

Verbs.—The excessive usage of verbs in this group of cases is as striking as the deficiency in nouns. In the 5,000 words there were 1,317 verbs, 339 more than in the same number of words used in the normal group.

The absolute vocabulary in verbs is but slightly below the normal, averaging 44.3 different verbs per person as against 48.8

per normal person. The variation in proportion to the usage is, therefore, very much lower than the normal and even less than that of normal children.

The verb most used is *do*, the same word most often used by the children. The great use of *do* is explained largely by the frequent occurence with these patients of such phrases as, " I don't know," " I don't remember," etc.

Adjectives.—430 adjectives were used, 189 less than were used by normal adults and 116 more than were used by the children. The variety was much less than with normal adults. There were but 110 numerals, 105 less than were used by normal adults.

The adjective *that* was most frequently used, followed in frequency by *this, right, good, little* and *old,* which were also used most frequently by the children.

Prepositions.—223 prepositions were used against 562 employed by normal adults; less than half the normal usage. This deficiency in prepositions is extremely significant. It was found that with normal adults the use of prepositions increased directly with the grade of culture, and as many as 98 were used by a single person, while the smallest number used was 28. Of these diseased persons but one used more than the smallest number from a normal adult, while the degree of culture had no effect on the usage, the patient of highest culture using the smallest number of prepositions (9).

The use of prepositions was much less than occurred with children. The variation in prepositions was far less than normal and even less than with children, there being an average of 7.6 different prepositions per person as compared with 12.8 with normal adults and 9.7 with children.

But one normal adult used a smaller variety of prepositions than the greatest number used by a patient with organic disease.

Moreover, the number of prepositions used increases directly with the size of the vocabulary as a whole, the use of prepositions, therefore, being an index of vocabulary defect and of brain disease.

Articles.—196 articles were used, 122 less than appeared in the normal adult series and 110 less than were used by the children.

In addition to this deficiency in articles, a significant feature

is that more indefinite than definite articles were used, as is the case with children, the reverse being true of the normal adults.

	Def. Article	Indef. Article
Normal adults	187	131 = 318
Children	144	162 = 306
Patients with organic diseases.......	86	110 = 196

Moreover, those who use the greatest number of indefinite articles have the smallest total vocabulary, the ratio for the two series being fairly constant.

Adverbs.—712 adverbs were used, 234 more than were used by the normal adults and 158 more than were used by the children. The average variety of adverbs per person was slightly greater than with the normal adults (organic diseases 26.1; normal adults 25.4), but the variety in proportion to the total usage was, of course, very much less than normal.

No and *yes* appeared 195 times (*yes* 99, *no* 96), more than six times more frequently than with normal adults (31) and more than twice as often as with the children (90), thus revealing the great lack of spontaneity with these patients, questions having been required to obtain a sufficient number of words for purposes of analysis. The other favorite adverbs were *not* (50 times), *here* (49 times), *so* (29 times), *there* (27 times).

Pronouns.—More than a fifth of the total number of words used by these patients was pronouns, 1,172 being used in 5,000 words against 700 in the normal adult series and 999 in the series of the children. Pronouns and verbs together compose about one half of the total number of words spoken; whereas, they compose but a third of normal adult speech.

Moreover, the average variety of pronouns per person was greater than normal (15.8 versus 14.6), though the variety in proportion to the usage was, of course, much smaller.

A variety of pronouns greater than that used by the average normal adult might at first sight seem contrary to expectations, being found with individuals whose brains are diseased and whose vocabulary is in other respects grossly limited. And yet a moment's consideration of the speech of children and of normal adults will show that such a finding should not prove a surprise, since the children actually average a greater variety of pronouns than their elders, and since in the adult group the person of highest culture uses the smallest variety of pronouns, while even a

writer like Hawthorne uses a smaller number than the average uncultured speaker.

The fact is that the pronoun is an extremely convenient word for those who are in need of a word. As its name indicates, it stands for or takes the place of a noun and accordingly is an ever present help to the youngster who has not yet acquired facility with names, for the aged person who has permanently or for the moment forgotten, and for the lazy-minded speaker or careless writer. The pronouns are thus fixed in memory by frequent use and by richness of associational connections.

A glance at the individual pronouns used is also instructive.

The pronoun *I* appears 459 times as against 318 times in the normal adult lists and 213 among the words of the children. Its frequency, however, probably is not an indication of excessive self-consciousness in these patients, nor an expression of a disproportional survival of the concept of the ego; for the use of *I* is not excessive as compared with the much greater than normal use of pronouns in general.

The pronoun *it,* on the other hand, occurs about five times more often with these patients than with the normal adult (151 times versus 32 with normal adults), and being a substitute word or pronoun *par excellence,* the reason for its excessive occurrence on the tongue of these word-poor subjects may be really seen. The word *it* was found 153 times in the children's words.

The same explanation applies to the frequency of the pronoun *that,* occurring as it does 100 times with the patients, 114 times with the children, and but 32 times with the normal adults.

Conjunctions.—The connecting words which were so difficult for children to acquire are again sparsely used by these diseased subjects, though there are exceptions. 165 conjunctions were used, while the children used 172 and the normal adult 229. And yet, though about one third less conjunctions were used than appear in the normal list, two patients used more than any normal person; on the other hand no normal person used so few as did four of the patients.

The variety of conjunctions averaged 4.7 per patient as against 5.4 with normal adults and 3.6 with the children.

And is the commonest conjunction as with normal adults and children.

Interjections.—While only 28 interjections were used by the

normal adults, 104 were uttered by the patients, the frequent use probably being due to embarrassment resulting from lack of readiness with other parts of speech; the exclamations being fundamental are not quickly lost in disease. The average variety of interjections per person was greater than with normal adults or children, being 2.8 against 1.9 in each of the normal groups. *Oh!* appeared 55 times as against 5 times in the normal lists.

Order of Frequency of the Different Parts of Speech.—The following tables give the parts of speech in the order of frequency of use in the three groups thus far studied.

Normal Adults		Children		Diseased Persons	
Nouns	1,088	Verbs	1,178	Verbs	1,317
Verbs	978	Nouns	1,053	Pronouns	1,172
Pronouns	700	Pronouns	999	Adverbs	712
Adjectives	619	Adverbs	554	Nouns	642
Prepositions	562	Prepositions	356	Adjectives	430
Adverbs	478	Adjectives	314	Prepositions	223
Articles	318	Articles	306	Articles	196
Conjunctions	229	Conjunctions	172	Conjunctions	165
Interjections	28	Interjections	68	Interjections	104
	5,000		5,000	Nonsense words.	39
					5,000

Among the important features of the analyses of the normal adult group, one of the most striking was the way in which the subjects fell into two groups; the one, composed of the persons of highest culture, using a majority of nouns, adjectives, prepositions and articles; the other, of those of lesser culture who express themselves largely in pronouns, verbs, adverbs and interjections.

Taking the normal adults as a whole, it was found that they use more words of the noun-adjective group than of the verb-adverb class (2,532 vs. 2,477). The relationship was reversed with the children, the verb-adverb class numbering 2,971 and the noun-adjective 2,029.

A still further reversal is found with the subjects of gross brain disease—the noun-adjective class shrinking to less than a third of the total number of words used (noun-adjective, 1,491; verb-adverb, 3,509).

Here we have a characteristic too pronounced to be neglected in a consideration of the effect of brain disease upon verbal expression. Allowing for personal idiosyncrasy, for the fallacy of statistics, for the particular choice of cases and for the comparatively limited nature of these analyses, we have still remaining

in the diseased persons a departure from the normal type of verbal expression sufficiently wide to warrant the most careful meditation.

Compared in tabulated form the figures are as follows:

	Normal Person	Children	Diseased Person
Noun-adjective group	2,523	2,029	1,491
Verb-adverb group	2,477	2,971	3,509
Total number of words	5,000	5,000	5,000

Not a single patient was there whose words of the verb-adverb group did not far outnumber those of the noun-adjective group.

IV

Conclusions From Study of the Vocabulary as Affected by Gross Brain Disease

From the foregoing analyses it may be seen that the vocabulary is not a negligible quantity among the factors helpful to the diagnosis of organic brain disease. The degree of loss from the word treasury, the changes in the use and variety of the different parts of speech, the character of the words used, the numerical relationships between the parts of speech, and especially the degree of preservation of the normal balance between the noun-adjective group and the verb-adverb group; these are matters which one can ill afford to disregard where the diagnosis is difficult.

So pronounced may be these pathological features that mere careful attention to a few sentences from the patient may suffice for a diagnosis of brain disease, as was true of a case of brain tumor recently reported and which may be briefly referred to.

The patient in question was suddenly affected by symptoms while on a summer day excursion with his children, and was for a time held under suspicion of drunkenness. He was later brought to consultation with a diagnosis of hysteria. Such diagnosis would have been instantly discarded had the physicians heeded understandingly the verbal expression of the patient with his avoidance of nouns, his excessive use of pronouns and his general word poverty.

In other cases where the defect cannot be detected by the ear a careful analysis of the stenographic record of the patient's speech will often prevent an error in diagnosis.

Despite the self-given warning as to the danger of making deductions from limited data, I am constrained to yield to the

temptation of hazarding at least tentatively a somewhat ambitious conclusion.

We hear much of auditory word centers and memories and of motor speech centers and memories as though there were no further doubt of the existence of brain areas wherein lay stored separate auditory and motor images or memories of individual words as known to the ear and tongue. Many writers even go so far as to mention word centers for different parts of speech, for numbers, letters, etc., just as Mills[7] has done for the visual memories of written speech.

Thus, Dr. G. M. Hammond[8] at a meeting of the Philadelphia Neurological Society, spoke of the "proper name center in the superior temporal region," and Hoppe believes that there are separate naming centers in different languages.

Such an arrangement for the storing up of individual words separately would require a large amount of brain space—perhaps more than the superior temporal, the lenticular area of *Marie* or *Broca's* center could afford. Moreover, it would seem an unnecessarily lavish disposition to make of precious brain tissue and a crude invention of nature for the future resurrection of mere words independent of their significance—an invention which would be put to shame by man's invention of the typewriter or the piano, whereby a limited number of keys properly manipulated suffice for the expression of unlimited words or the reproduction of an infinite variety of harmony.

And, indeed, the study of vocabularies seems to prove that no such centers exist for the preservation of individual word sounds or word movements, as traces, images or memories distinct and separable from the centers having to do with the content, meaning and function of the words themselves: at least, that such discrete memories cannot exist for other than a few words of simplest form.

Let us assume that there is a motor speech center where the memories of the motions of expression *for each word* are registered. Then imagine those word traces arranged in any conceivable manner. Let them be nicely classified according to parts of speech in most convenient form. Here the nouns, there the verbs, there the conjunctions.

Now imagine a lesion springing from this, that or the other direction. In one case the nouns would suffer, from another

lesion the verbs, or a portion of this or that part of speech would be eradicated. From the widely different accidents to which the brain is subject, would arise an infinite variety of types of motor word aphasia. There would be a motor noun aphasia or a motor verb aphasia, etc., according to the extent and situation of the lesion.

But no such clinical varieties of aphasia are met with. From whatever direction the injury comes, whether it be frontal, temporal, from within, without, or from the structures beneath the brain, the loss of speech varies only in degree, proceeding always in the same manner, destroying first the superficial, the unessential, the least often practiced words, and leaving till the last the words first acquired and oftenest used.

Or conceive the word traces to be arranged in a jumble regardless of their class, or, suppose them to be grouped according to similarity of sound or with regard to the particular muscles or motions necessary for their reproduction. In the first instance there would also be no law or constancy in the manner or form of speech loss from different lesions, whereas these studies show that no such irregularities occur; in the second and third suppositions the words would be lost according as they were expressed by this or that sound or motion and not with any reference to their significance, associations or acquirement.

By the same reasoning the existence of an auditory word center *as an area for the recording or storing up of discrete word memories* is excluded. If there were such a center—whether in the first temporal gyrus or elsewhere—the loss of word comprehension would be found in an infinite variety of types according to the nature, extent and location of the lesion affecting the area in question, a finding contrary to clinical experience.

We are forced to conclude that there is no auditory center for words as such and no speech center for words as such. It must be admitted that there is a center differentiated for the reception and registration of vocal sounds as related to words, and that there is also a speech center designed for the reproduction of those sounds in the form of words. The centers must be very closely connected by numerous associational pathways.

Since, however, words as heard and as spoken are but sounds without meaning save as related to sensory memories, and to higher intellectual and emotional processes, all that is required

for the purposes of these higher functions is a mechanism on one hand, capable of receiving and registering all elementary vocal sounds, so arranged that any conceivable combination of sounds may be experienced and according to experience be recognized and interpreted as words, and on the other hand a center capable of pronouncing and reproducing all of the elementary articulatory movements in such combinations as may be necessary for verbal speech.

The verbal articulatory and the verbal receptive centers are thus mere switchboards wherein comparatively few elements with wide spreading associational pathways suffice for the whole business of word understanding and word expression.

Thus it happens that the loss of words as a medium of expression and of words as a medium of understanding proceeds in a more or less uniform way regardless of the situation of the lesion, and differs in degree according to the extent of obstructions to the associational pathways.

The brain is no dictionary of separate words tabulated either by sound or motion. The speech function has probably been constructed according to principles on the one hand less crude than appear in the usual text-book conception, and yet on a plan infinitely more simple and less prodigal of time and space than has been represented in most theoretical descriptions of its supposed action.

These studies do not pretend to furnish more logical conceptions of the mental activities concerned with speech than have thus far been formulated and offered by students of normal and abnormal mind. They merely strive to show by analysis of a limited number of vocabularies that the way is open to us to acquire at the mere cost of effort a far wider knowledge than we at present possess of mental processes both normal and morbid.

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Society Proceedings

CHICAGO NEUROLOGICAL SOCIETY

December 17, 1914

The President, Dr. Douglas Singer, in the Chair

CASE OF PROBABLE ANEURYSM IN THE REGION OF THE PETROUS PORTION OF THE TEMPORAL BONE

By J. C. Beck, M.D., and H. L. Pollock, M.D.

Miss E. B., aged 21 years, consulted the speakers on the seventh of February, 1914, complaining of headaches which began about one year ago, also of lachrymation. She had had her eyes examined a month before and was told that the left eye was blind.

When two years old, she fell from a chair while standing and struck on the back of her head. Two days later began to have high fever with her head retracted. A physician said it was an inflammation of tissues covering the base of the brain. This lasted six weeks. At age of nine she was compelled to leave school for two years on account of nervousness, as she was threatened with St. Vitus' dance.

She had diphtheria when a child. About seven years ago the left ear began discharging intermittently, and then discharged for four years, but there has been no discharge for past three years. She does not hear well in left ear.

She has continuous headache, usually over left frontal region and pain down the left side of the neck. She is sometimes awakened at night by sharp lancinating pain in head, intermittent in character. She complains of dizziness when standing awhile or when stooping. Objects around her seem to be moving.

Examination of Nose.—Right side: Deflection of the septum high up, shutting off view to middle turbinate, corresponding concavity on left side with enlarged middle turbinate.

Throat.—Thickened posterior pillars and some post nasal mucus.

Ears.—Right ear is normal. Left ear: Large central perforation. Ear dry. Rinne positive in right ear. Negative in left.

There is a slight tremor of the tongue in the left half and that side does not seem quite as well rounded as the right side, although it does not show any great amount of atrophy.

Vision.—Right eye: 20/30 with plus 50 equals 20/20. Left eye: 3/100, which does not improve with lenses. Ophthalmic examination of right eye, normal. Left eye: Bleaching of lower temporal quadrant of disc. Field examination of left eye shows eccentric field, contracted on nasal side. Irregular central scotoma, with a field for red contracted to a very small central area. No perception for blue or green. Right eye: General slight contractions for all colors.

February 16. Urinalysis normal. Blood examination: Hemoglobin, 90 per cent.; small lymph., 44 per cent.; large lymph., 33 per cent.; polynuclear, 62 per cent.; eosin, 1 per cent.

February 17. Wassermann was made but proved to be negative. K. I. was prescribed in increasing doses.

March 3. Had been taking K. I. since February 17 and now taking 20 grains three times daily, but she is very nauseated and has an iodine rash.

March 4. A spinal puncture was made, the fluid escaping under moderate pressure. Examination of the fluid showed Wassermann, Nonne-Apelt, Lange all negative, but there were 50 cells to a cubic millimeter. Advised to remain under observation.

March 10. Since the puncture was made, patient complained of having a pressure in head, seeming to radiate into both temples, especially when in the upright position. Relieved when she reclines.

March 12. X-ray stereo-radiograms were made of head and neck and were found to be negative as to any findings.

April 15. Condition the same, although headaches somewhat better, and patient feels stronger.

May 19. Returns complaining of frontal headaches. Fundus examination shows left nerve-head white. Vessels more tortuous, vision gone completely, no light perception. During the summer patient went to the country and reports state that she was feeling fine and gaining in strength.

July 14. She was referred to Dr. George Hall for examination. His diagnosis was that there was probably a gliomatous process involving the basal ganglia.

September 14. Feeling fine. Just returned from the country. Atrophy of left side of tongue more perceptible, also more tremor. Soft palate and uvula draw slightly to right. Showing a slight paresis of left side. Both arytenoids movable. Can not see cords. Left pupil reacts to accommodation, sluggish to light. Fundus shows no change.

September 29. Patient returns, showing a paresis of the external rectus and a slight edema of both eyelids with a beginning exophthalmus.

October 26. Condition the same except more headache and considerable exophthalmus.

A decompression operation was advised.

Operation.—October 30. General anesthetic. On account of the old middle ear suppuration, the mastoid was opened and was found to be normal. The dura was exposed in the region of the attic and was also normal. Going backward from the upper mastoid wound an area of bone about $3 \times 2\frac{1}{2}$ inches was removed, thus exposing the supra- and infratentorial region. The dura appeared normal and no bulging or tension discovered. The dura was split and the underlying brain tissue appeared to be normal. While exploring with the index finger over the posterior surface of the petrous portion of the temporal bone a sudden gush of venous blood occurred. This bleeding was tremendous and the region was immediately tightly packed with gauze, but notwithstanding that the lateral sinus was clamped off both anteriorly and posteriorly to this region, the bleeding continued and not until the internal jugular was ligated did the bleeding become less. At this time the patient was pulseless and almost gone. The gauze was left in situ, the dura stitched and the external wound closed hurriedly, except at the postinferior angle of the wound, where the gauze was left for drain. The patient was stimulated and

quickly responded and in a few minutes was conscious and speaking. The gauze was left in for a week, gradually being withdrawn.

The patient had never any rise in temperature, nor any more bleeding. She made an uneventful recovery. She now states that she feels better than she has for years, feels stronger and has no headaches. The exophthalmus and paresis of the sixth are gradually improving. She has now light perception in the temporal side of the eye. The paresis of the tongue and soft palate are about the same.

Dr. Hall said that, according to his record, the heart was negative. His findings, independent of those of Dr. Pollock, in July, showed that the patient complained of headache, extending down the back of the neck, in the left occipital region. The blindness in the left eye began February, 1914. The right eye was normal. There was no history of vomiting. Examination showed the right pupil normal; left one, no reaction. Tongue atrophied on left side—deviated toward the left. Soft palate showed paresis on left side. The patient stated at that time that she lost her voice at times, but not for any length of time. She had a peculiar speech, more or less characteristic of a bulbar condition. Slight nystagmus to the right. Seventh nerve on left side showed slight paresis. Fifth nerve showed no apparent involvement. Drooping of left eyelid at times. Sixth nerve showed paresis. Left eye more prominent than right. The eighth nerve apparently affected; complete deafness in left ear. No other evidence of paralysis or sensory disturbance, according to the speaker's findings in July, and no evidence of cross-paralysis, which he looked for very carefully at the time. Since operation the patient states that the headache is much less than it was, but on examination, December 11, the speaker noticed, on looking at the left eye, that she seemed to be able to detect light on the nasal but not on the temporal side. Right eye normal at that time, reacting to light. Pupil of left eye at that time slightly smaller than right. Palpebral fissure rather narrow on left side. At that time the patient complained of slight headache.

The diagnosis made by Dr. Hall in July was a brain tumor—very likely a gliomatous growth in that region. The thought of aneurysm did not enter the speaker's mind, because the test for syphilis was absolutely negative and she had no heart lesion. The speaker would hardly be willing to make a diagnosis of aneurysm unless he had very positive findings to substantiate such diagnosis. Even after seeing the patient again he would not be willing to make the diagnosis of aneurysm, rather than tumor.

It was easily seen, with the decompression operation made, that the temporary results might be present in case of tumor, and it seemed to the speaker a little too soon to make the diagnosis of aneurysm. Time alone would tell whether or not there will be recurrence of the symptoms.

Dr. Peter Bassoe thought it doubtful that there was an aneurysm present in the case exhibited. In cases of aneurysm there is apt to be a bruit, which is absent in this case.

In regard to the gush of blood at the time of operation, referred to by Dr. Pollock as being from an aneurysm, it would seem to the speaker very unlikely. If there was an aneurysm large enough to cause loss of vision in the left eye and affect all the nerves down to the hypoglossal, such hemorrhage at the time of operation would not be stopped by simple ligation of the jugular vein.

Dr. Pollock (closing) said that he had nothing further to say, except

that the diagnosis had been one of " probable aneurysm." It was not positively diagnosed as an aneurysm, but such condition was thought probable. The condition was one embodying a large circle of veins. It was a venous bleeding that occurred at the time of operation, not arterial. It had been intended to explore the pontine cerebellar angle, but it was impossible to continue with the operation, owing to the condition of the patient. Finding nothing else but this tremendous gush of blood from the veins, they concluded that it was a case of involvement of a large number of large veins, sort of a bloody tumor which was ruptured.

One other thing, namely, the fact that there was a depression instead of a hernia present. Pulsation is present. So far, the symptoms have improved; the vision is better. No headaches; patient feels better than she has for years. There is no improvement in the paresis of the tongue or soft palate.

CASE OF ACROCEPHALOSYNDACTYLISM

By Benjamin F. Davis, M.D.

The patient was a girl, three years of age. She was born at term, normal delivery, no hydramnios. The family history is negative so far as deformities similar to this are concerned. The patient is the youngest of four children. Between the second and third children the mother had two miscarriages. The Wassermann test of the patient's serum is negative.

The features characteristic of this clinical entity are found in the peculiar deformity of the skull, the syndactylism of the four extremities and the malformation of the hard palate. The skull is flattened posteriorly in such a manner that the external occipital protuberance is lacking. The squamous portion of the occipital bone is smooth and vertical. Just above the lambdoid suture the skull bends forward and upward; the highest portion is at the bregma and runs over quite abruptly into the plane of the forehead and face. Although the frontal area has in general a vertical direction, there is a bulging in the middle portion which is separated from the superciliary ridges by a shallow furrow. The frontal suture is open for its entire length of nine centimeters; its greatest width is four centimeters. The orbits are highly arched; the superciliary ridges are much flattened, and the roofs of the orbits are tilted downward and backward at about an angle of forty-five degrees from the normal, so that they are easily palpated. There is marked exophthalmos. In the eye-grounds, examined by Dr. Darling, there is some tortuosity of the retinal vessels and slight evidences of edema of the nerve head. The temporal and zygomatic regions bulge markedly, making the face somewhat the shape of a kite. The bridge of the nose is depressed. There are ten strong though rather poorly formed teeth on each jaw. The right and left alveolar ridges of the upper jaw project medially, coming into direct contact in their anterior portions, thus forming a sort of balcony above which is the highly arched hard palate.

The mentality appears to be fairly normal for a child of this age, although it is difficult to form a judgment on that score.

The hands were operated upon by Dr. Carl Beck three times during the first year of the patient's life. Preceding the operation the characteristic type of syndactylism was present. The union was more intimate

at the tips of the fingers than at the bases and hands were immobilized in the so-called "main d'accoucheur" position. At present the digits are more or less completely united by scar tissue and present some irregular deformities, although they no longer suggest the "main d'accoucheur." The toes show the same type of syndactylism. In X-ray plates of the hands evidence of bony ankylosis not only obliterating most of the joints of the fingers, but also uniting the bones of certain neighboring digits side to side are present. Part of this condition may have been congenital; part may have been a result of the previous operations. Bones for the normal number of digits are present in each hand.

On the right foot there are but four nails; on the left there are five. X-ray plates disclose a bony framework for six toes on each foot. The first and second metatarsals are partially fused.

In X-ray plates of the skull there are marked shadows of digital impressions which are ordinarily considered diagnostic of increased intracranial pressure of relatively long duration. The sella turcica is wider than normal. The frontal suture is open for its entire length. The coronal, sagittal, lambdoidal sutures and the sutures at the base and sides of the skull appear to be closed. The restlessness of the patient prevented the making of good plates of the jaws and teeth.

· The etiology of this condition is uncertain. At present probably the best we can do is to consider acrocephalosyndactylism a developmental anomaly.

In regard to surgical treatment, something might be done to cure the syndactylism although the bony changes in this case would probably make such attempts unprofitable. At present there is no good reason for interference with the head. Should further evidence of increased intracranial pressure, such as increasing dimness of vision, headache, vomiting or involvement of other cranial nerves manifest themselves, a decompression operation might be considered, although the results of similar operations under like indications in certain cases of tower-head do not offer much encouragement.

Dr. Peter Bassoe said that Dr. Davis did not explain the long term which he used as a title for his report. As he understood it, that term was invented by a French writer, who had found quite a number of cases presenting the particular combination of deformities. It was first described in 1905 by Apert, of Paris, as akrosphenodactylie, and this writer had seen two or three cases. This year a collection of ten cases was published in the Zeitschrift für die gesamte Neurologie und Psychiatrie. It is a striking fact that all these cases are alike. It is not an accidental combination of deformities, but must stand for some particular occurrence during fetal life. All the cases have shown the same anteroposterior flattening of the head, instead of lateral, as in typical thurmschaedal. Dr. Bassoe also pointed out that the X-ray of the right foot shows six metatarsal bones.

Dr. Peter Bassoe reported two successfully operated cases of extractural fibroma compressing the cord. (*To be published in this Journal.*)

Dr. Julius Grinker thought the doctor was to be congratulated not only on his correct localization, but also because he was fortunate to see cases with favorable recoveries. Too often the neurologist is called when the cord structures have been completely and irreparably damaged by a growing neoplasm, which is sufficiently early for a diagnosis, but altogether too late for operative results. Of the many opportunities he has had of

diagnosing and later verifying such diagnoses on the operating table, only one of these spinal tumor cases, so far as he could remember, made a recovery equal to either of those presented by Dr. Bassoe. To enumerate but a few from his experiences. One case he had had about seven or eight years ago, correctly localized by him and operated on by Dr. S. C. Plummer, had been found to have reached such a stage of advanced degeneration of the pyramidal tracts, that though sensation had been completely recovered, motion had been restored only in part. The patient, a woman, is still suffering from an incomplete spastic paraplegia. Another case, also operated on by Dr. Plummer, was found to be a circumscribed serous meningitis, one of the first to be recognized and diagnosed as such. It was this man's case Dr. Grinker had in mind when he stated that he had only one case that approached Dr. Bassoe's results in the two he presented, although he had a case too recent to report, in which he expected another favorable recovery, that is, one with but slight disability. The case was interesting from the fact that several physicians had treated the patient for neuralgia and rheumatism during the period of one year before coming under his observation. It was easily recognized by him as a case of von Recklinghausen's disease and operation advised. The tumor was found as diagnosed, opposite the sixth cervical vertebra, and consisted of a bilobed fibro-lipoma, which Dr. Morgan successfully enucleated. The patient, a woman, is recovering. One must bear in mind that not all spinal tumors are benign. Of the several malignant spinal tumors from his practice, both hospital and private, he wished to mention only two. The first case was one which had been treated for some time as one of acute pleurisy, because the family physician had elicited a history of pain in the thorax. When, however, the pain had completely subsided owing to destruction of a posterior nerve root, the patient had considered herself well. With the pain recurring, and on the opposite side of the chest, the physician in his dilemma pronounced it a new attack of pleurisy. The case was brought to the speaker's service in the Cook County Hospital, where he diagnosed and correctely localized the spinal tumor, which Dr. E. Wyllys Andrews, the staff surgeon, discovered to be an epidural sarcomatosis of such extensive proportions that removal was impossible. The last case Dr. Grinker wished to mention in connection with this presentation was one which was seen both by him and Dr. Hassin, and which interested them both because a cyst superimposed on a tumor gave false localizing signs. Dr. H. M. Richter, of the Cook County Hospital, operated and emptied the cyst containing thickened yellowish fluid. As no improvement followed this operation, the same surgeon subsequently reentered the spinal column somewhat lower and discovered an infiltrating sarcoma of the meninges in the dorso-lumbar region. There was no improvement.

Dr. Grinker believes that in spite of the fact that the favorable results of spinal cord tumor surgery are not always those detailed by Dr. Bassoe, we should advise operation in every case of tumor of the cord so soon as the diagnosis has been made certain and in many cases when the diagnosis is only probable. It is better to make several exploratory laminectomies and to discover one such case as presented here, than to be always right and miss a removable tumor because the indefinite symptoms did not present clear-cut operative indications.

Dr. Bassoe thanked Dr. Grinker for bringing out the points he did. It is very important to call attention to the insufficient amount of spinal

cord surgery being done in Chicago. There is a pessimism among surgeons that is difficult to overcome. We should not fail to operate on cases whenever there is some chance of success. He believes the skepticism of surgeons is largely based on the fact that they get their experience from traumatic cases, when the matter is entirely different. The fact should be emphasized that whenever a patient has paralysis from spinal cord injury, the prognosis is bad, even if one can repair the injury to the bone. The damage to the cord is oftentimes instantaneous; even in case of a dislocation reduced immediately the cord may be destroyed for all time to come. On the other hand, when it comes to slow compression of the cord, it is most remarkable how the cord can be flattened out and yet resume normal function. In both of these patients the spinal cord was flattened out—especially in the second case.

DEMONSTRATION OF SEVERAL TYPES OF MUSCULAR ATROPHY

By Julius Grinker, M.D.

Case I. The patient, a married woman, 38, with no faulty heredity and with negative personal history, was well until about two months ago, when she developed headache, chills and fever, general malaise and backache. About four days later there developed paralysis of the muscles of shoulder and arm on the left side, leaving the forearm free. After an interval of four days and without the recrudescence of acute symptoms, the patient discovered that her left hip and thigh were also paretic. While at first unable to move the left shoulder and the left thigh, she is slowly improving in both. Reaction of degeneration is present in the affected muscles; there is absence of the left patellar reflex and of the left Achilles reflex. Though this is not a remarkable case for acute anterior poliomyelitis in adults is by no means rare, yet the evolution time of the paralysis (over a week) is interesting, also the distribution of the paralysis in the upper halves of both left extremities.

Case II. The patient, a single machinist, 36 years old, with negative family history and practically negative personal history, excepting an attack of gonorrhea five years ago and a doubtful chancre three years ago, noticed the gradual development of weakness and atrophy of the muscles of the right hand, but more especially of the right thumb, beginning about two years ago. Soon thereafter the right arm became similarly affected and within a period of one year the left hand and arm became involved, so that there is now present well-marked atrophy of both upper extremities, including the shoulder girdle. The wasting appeared in an ascending manner on the right side, but seemed to follow a descending course on the left. Sensory disturbances were absent throughout, both subjective and objective ones. The reflexes appear lost or reduced in the upper, somewhat exaggerated in the lower extremities. There are no bulbar symptoms present. Sphincters are intact. The case is undoubtedly a good example of progressive spinal muscular atrophy, unless we choose to call it amyotrophic lateral sclerosis on the hypothesis that the upper motor neuron will eventually become implicated in the degenerative process.

Case III. Patient, a boilermaker, 61, single, who admits having had a case of gonorrhea in 1889 and chancroid in 1886, developed weakness

and wasting of the muscles of the left shoulder and arm muscles about fifteen months ago. Six months after the beginning of the trouble the same condition was noticed on the right side. He is uncertain as to the period when the clawed fingers developed on either side, but it appears that they were present before his fall last June, which ushered in the paralysis of the neck muscles and the bulbar syndrome so manifest in this case. The head, when unsupported, drops on the sternum; there is present dysphagia, dysarthria, salivation, and fibrillary tremor in the atrophic lingual muscles, which have that peculiar velvety feel characteristic of the condition. The deep reflexes are markedly exaggerated even in the wasting muscles and tendons. Lower extremities are spastic and paretic, while the upper are completely paralyzed, so that feeding has become impossible. Owing to non-use of the joints, there has developed arthritis in shoulder and elbow joints, passive motion of which causes pain, otherwise there is no sensory disturbance present, nor have the sphincters ever been involved. The diagnosis of this case is amyotrophic lateral sclerosis with bulbar paralysis.

CASE IV. The patient, aged 25, single, with good family history, dates his motor difficulties from his fourteenth year. It was then that his gait became clumsy, though the calves of his legs appeared larger than formerly. Gradually the shoulder muscles wasted away; still later, the pelvic girdle became implicated. Though the arm and thigh muscles are atrophic, the forearm and hand muscles, as well as the muscles of the legs and feet, have remained normal. The patient shows a peculiar vacant expression in his face and there is a marked drooping of the lower lip. His gait is of the "waddling" type and in attempting the rise from the recumbent posture he climbs up on his legs and thighs. The disease has remained stationary for several years and excepting for the motor difficulties the patient enjoys comparative comfort. This case is easily recognized as one of progressive muscular dystrophy, showing a combination of the several types in one individual.

CASE V. The patient, a man of about 45, resembles, with reference to the atrophy and spasticity of muscles, the case which was demonstrated as one of amyotrophic lateral sclerosis. The upper extremities show marked wasting and loss of reflexes, while the lower are spastic and have exaggerated reflexes. There are areas of anesthesia and hypesthesia in the lower extremities, affecting all qualities of sensation. This picture of muscular atrophy was produced by a fracture-dislocation of the fourth cervical vertebra with consequent compression of the cord. When the trauma occurred, ten years ago, patient became immediately paralyzed, but gradually some power returned. It is needless to add that no operation was performed in this case; had it been done, it is doubtful if they would have had the opportunity of demonstrating the patient alive. Much unnecessary surgery is being done on traumatic cord cases after the destruction of cord tissue has become evident. Many of these cases make better recoveries without operation.

Dr. Sigmund Krumholz reported a case of atypical multiple sclerosis with bulbar palsy. (*To be published in this Journal.*)

Dr. Hassin had seen the patient several times, at the request of Dr. Beck. The speaker had examined the patient and his impression was as follows: She had a unilateral lesion of the twelfth nerve, of the hypoglossus, which was involved on the left side, accompanied by a marked atrophy of half of the tongue, not only atrophy, but also marked fibrillary

twitchings; the left eleventh nerve was also involved—torticollis was present; also the left tenth nerve, the pneumogastric, was involved, as shown by the paralysis of the uvula and soft palate and vocal cords; the glosso-pharyngeus nerve was also involved (deglutition troubles). His impression was that the patient was suffering from paralysis of the twelfth, eleventh, tenth and ninth nerves on the left side. There were no sensory disturbances. No particular reflex disturbances were present, except that the tendon reflexes were rather lively. Deafness was quite severe. There was slight nystagmus. He considered that the condition found was due to some extracranial pressure where the nerves leave the skull, namely, at the jugular foramen, where they form one bundle. So he maintained that at this place all the mentioned nerves were compressed by one of the tuberculous glands that that girl suffered from, and the X-ray picture showed a gland at this place. The speaker urged Dr. Beck to remove the gland, thus removing the pressure, believing that the girl would recover. Operation was performed about thirteen months ago, and during the time since operation the patient has shown remarkable improvement. The atrophy of the tongue has almost gone; the fibrillary twitchings have almost gone. There is still slight paresis of the uvula. There is no trouble with the voice. All the severe lesions that she showed have disappeared. The anatomical improvement is not perfect yet, because the degenerated tissue requires time to regenerate. It will be more than a year before the anatomical relations will be perfectly restored. Therefore, the speaker's explanation is that the girl was not suffering from a multiple sclerosis, because multiple sclerosis never shows fibrillary twitchings, and never causes degenerative atrophy—and the atrophy this girl showed was degenerative. Also, if the case were one of multiple sclerosis, it would be difficult to explain the steady, progressive improvement shown since operation; therefore, the diagnosis, in his opinion, would be one of an extracranial tumor pressing on the twelfth, eleventh, tenth and ninth nerves.

Dr. H. L. Pollock wanted to say just a word regarding the operation. He had brought some X-ray pictures showing the gland referred to.

In regard to the nystagmus present in this case, it is not horizontal, but rotary, which is attributed to the vestibular irritation from the otosclerosis. In the treatment of the otosclerosis, she was given large doses of adrenalin, as high as fifteen minims of the adrenalin chloride, two or three times a week, hypodermatically, for possibly a year. Her two sisters, above referred to, received the same amount, but it did not cause nystagmus in them.

Dr. Joseph C. Beck, who did the operation, dissected out the ninth, tenth, eleventh and twelfth nerves, at their exit from the skull, and found them surrounded by degenerated calcareous glands. Each nerve was dissected out separately and surrounded by Cargile membrane to prevent adhesions. It is the opinion of Dr. Beck that the lesion was extracranial and was a tumor or growth of the degenerated glands, which pressed upon these nerves. All the symptoms have improved. The tongue is very much improved.

The X-ray pictures were all negative, only one gland showing, and that one far away from the base of the skull, but the glands dissected were away up at the base of the skull, which did not show in X-ray pictures.

The microscopical examination of the calcareous glands proved it to be tuberculous.

Dr. George W. Hall said, if he remembered correctly, Dr. Krumholz stated that he found a positive Babinski on the right side, and none on the left side. If that is the case, the speaker would like to know the explanation of it on an extradural or extracranial basis. He did not know whether Dr. Hassin had observed this condition also.

Dr. Bassoe said that the abdominal reflexes are very rarely normal in multiple sclerosis. He would like to ask the essayist if he had looked in the literature to find any cases of genuine atrophy of the tongue and palate in multiple sclerosis. He thought that was a very rare thing. In fact, it is one of the characteristics of multiple sclerosis that we may have a patch involving a cranial nerve, or an anterior horn, without any atrophy whatever. In three cases which he has examined, he has found patches involving all of the anterior horns at a certain level, and yet not a particle of degenerative atrophy in the corresponding muscles. The speaker was aware that muscular atrophies have been observed in cases of multiple sclerosis, but it is an unusual thing, and so far as these particular cranial nerves were concerned, he would like to know if Dr. Krumholz had looked up the literature on that point. The condition seemed to him to be more likely a local lesion, perhaps not only pressing on the nerves, but also a localized hyperplastic tuberculous pachymeningitis, or something analogous to that. This condition could cause pressure on the pyramidal tract, and cause a Babinski sign.

Dr. Krumholz said that the diagnosis in this patient was subject to disagreement. Dr. Hassin seems to be convinced that the paralysis in this patient is extracranial, produced by tumor pressure upon the nerves at their exits from the skull. He stated that the Roentgenological pictures having shown a tumor at the jugular foramen helped him to reach this conclusion. Dr. Hassin was apparently misinformed upon the reading of the X-ray plates. They show absolutely no changes at the base of the skull or vertebræ. This the speaker was informed of by Dr. Beck a year ago, and Dr. Pollock demonstrated this fact this evening with his plates. The calcareous gland shown in the pictures is located in the submaxillary region. Had the Roentgenographic reading been tumor (tuberculous glands) at the jugular foramen, there would have been no room for differential diagnosis. Dr. Hassin is under the impression that the torticollis (which he attributes to a paralysis of the eleventh nerve) has occurred concomitantly with the paralysis of the tongue, palate and larynx. Here, again, he was misinformed. The fact is that the patient is nursing her stiff neck for the last six years, and that the muscles of the neck are spastic and not paralyzed. The torticollis has no relation to the bulbar paralysis. Dr. Hassin appears to believe that the patient has improved since the operation. Dr. Krumholz agrees that the patient has improved, but this improvement has taken place, to a marked extent, during his observation, before the surgical intervention. This remission of symptoms the speaker had mentioned in his letter to Dr. Beck, written some time before the operation.

Dr. Hassin stated that the atrophy of the tongue has almost disappeared. It can be readily seen that the tongue is considerably hemiatrophied, where the furrows, in the speaker's opinion, are deeper than ever; and the anatomical changes of the palate and larynx have not materially changed.

It is now thirteen months since the operation. If this paralysis is due to a pressure neuritis, the pressure having been removed for thirteen

months, it is reasonable to expect more marked improvement by this time.

Dr. Hassin is positive that the patient cannot be afflicted with multiple sclerosis, reasoning that in the latter disease fibrillary twitching and degenerative atrophy do not occur, and the progressive improvement would not have taken place. This may be Dr. Hassin's personal experience. This statement will not be borne out by clinical experience. A number of clinicians have referred to having seen atrophy in multiple sclerosis. Only recently Goodhart reported one case with atrophy of the legs, and Kennedy published two cases with atrophy of the face. Fibrillary twitchings of the tongue are known to occur not only with, but even without, atrophy. It is an error to think that the improvement is progressive. There was an improvement, and now the condition is stationary. Dr. Krumholz would rather interpret this deceptive progressive improvement to be a "remission and intermission" of symptoms, which is so characteristic of multiple sclerosis. The oversight of this clinical phenomenon is greatly responsible for the pseudo rare occurrence of multiple sclerosis in this country.

In reply to Dr. Pollock as to the character of the nystagmus, it matters little whether the nystagmus was horizontal or rotary, as both may occur in intra- and extracranial lesions. His opinion would be more convincing of this being a labyrinthine nystagmus were he to have substantiated it with the caloric and turning tests. In otosclerosis labyrinthine lesions are only possible, but not probable. In nystagmus due to vestibular irritation, the slow component of the nystagmus is directed towards the side of the lesion. In this patient the slow component is directed to the median line.

The finding of tuberculous glands at the operation is interesting, because Stan Fleshen, in a recent preliminary report of eighteen cases of multiple sclerosis with distant tuberculous lesions, expressed the opinion that tuberculous lesions in distant organs are probably the specific etiological factors of multiple sclerosis.

Dr. Krumholz agrees with Dr. Bassoe that in multiple sclerosis atrophy of the tongue is rare. Oppenheim, in his textbook, mentions his observation of "hemiatrophia lingualis" in multiple sclerosis. Fuerstner published a case of multiple sclerosis with fibrillary tumor of the atrophic tongue, and on necropsy found a sclerotic process in the medulla and hemispheres.

The speaker thinks that after some observation it is fairly reasonable to diagnose the disease in this patient as multiple sclerosis. Had the Babinski been constantly present, the abdominal reflex absent, and had the changes of the discs been more advanced, this case would have been not atypical but typical multiple sclerosis.

Translations

THE DREAM PROBLEM[1]

By Dr. A. E. Maeder

ZÜRICH

(Translated by Drs. Frank Mead Hallock and Smith Ely Jelliffe)

The reason for the choice of this theme as the principal sub-
ject of discussion at to-day's meeting is a publication of mine on
the same subject, which has called forth opposition, especially in
the circle of our Vienna colleagues. As I had the distinct im-
pression that I was misunderstood, I gladly seized the opportunity
to speak on the question to-day. There were in my opinion two
principal reasons for the misunderstanding. The first reason is,
presumably, that I did not succeed in expressing myself clearly
in what I had to say on the subject. The work which appeared
a year ago in the "Jahrbuch" had been written two and a half
years ago, at a time when the problem was not very familiar to
me. The second important reason for my being misunderstood
lies in the fact that the point of view therein given discovers a
new field of thought in psychoanalysis, with which we must be-
come acquainted. This new field is not an individual discovery,
for it is also to be found in the works of the last few years, espe-
cially in those by Jung, Riklin, Silberer and, in some respects,
in those by Adler and others. I consider it extremely important
for us all that we should have opportunity to debate together, and
publicly, these questions that so greatly occupy us; the more so
as I have the conviction that no real or necessary differences
exist between us, for what we of the Zürich school have accom-
plished is a natural outcome of what Freud gave us. The new
field of which I spoke just now is analogous to the new view
which opens before the wanderer when he reaches a turning of
his road. Before I touch my theme, let me remark that the ex-

[1] A paper read at the Congress of the Psychoanalytical Society at
Munich, September, 1913.

planations I give to-day are not an official presentation of the Zürich point of view, but only expressions of personal conviction and point of view. Still, they are suited, I hope, to show existing differences in opinion.

In this paper, here offered for discussion, I have assumed two chief functions of the dream: the cathartic and the preparing function. In my talk to-day, I shall confine myself to the second function, as the most important and the most disputed. My erstwhile formula must be changed, since I have recognized that the functions mentioned hold good, not only for the dream, but for almost all products of unconscious activity (such as day phantasies, works of art, play, visions, etc.). They are functions of the unconscious itself, which in these phenomena arrive at expression. It will be the task of later workers to furnish the reason for the connection between these phenomena. Besides, you will recall that Freud has looked ahead here as in all other fields, in that he set on record the axiom that neurotic symptoms must be regarded as " unsuccessful attempts at cure." Among these different elaborations of the unconscious functions, the dream assumes a peculiar place, in that it is at work every night. It is a modest servant who performs his task in silence. It seeks for a satisfying formula for the unconscious condition, and strives for its expression. This dream work can exercise a really liberating action which betrays a close relationship to work of art. Various authors have already drawn attention to this, Rank among others. But in the formu're to date, the chief stress has been laid upon the cathartic action, on the unloading of the emotion, whilst, in my opinion, the overcoming of the conflict, the real freeing by means of sublimation, is the chief function of the work of art. Mensendieck, to whom we owe valuable, but unfortunately not yet published researches in this field, will illuminate this problem for you in detail in his lecture on Wagner—" The Prospective Tendency of the Unconscious in Wagner's first Drama and in Parsifal."[2]

The artist seeks in his work the solution of his actual conflict or, rather, he realizes in it the solution of his personal life problem. There is at stake a long attempt, which stretches over all his work, and in which only the fewest succeed even approximately. On a more modest scale, and in quite different propor-

[2] This lecture was given at the same Congress in Munich.

tions the dream seeks to do the same for every man. A work of art carries out a social function in that it serves as a model, by virtue of its high spiritual elaboration, whilst the dream has to content itself with the rôle of a purely individual means of expression, which, nevertheless, is yet a very important rôle. The use made of dreams in the ancient religions is for us a premonition of the connections in which it is now really recognized.

The following sentence, taken from Horneffer's work " The Priest," will clearly illustrate this point: " The sick Greeks, who made pilgrimages to the temple of Æsculapius, in order to undergo the temple sleep, did not want to know what had caused their sickness, but hoped in the dream to come in contact with the holy Æsculapias and to receive from him directions for the treatment to be followed in order to effect a cure."

The liberating function of the dream is here expressed as a hint from God in the so-called mythical phase of realization; the dream itself is considered by me as a part of the curative process. You will permit me to remind you of the keen saying of Hebbel on this same point. It is: " This I know; such dreams one should not despise. I fancy it to be this way: when man lies asleep, relaxed, no longer held together by self-consciousness, a feeling of the future crowds out all thoughts and pictures of the present, and those things which are to come glide like shadows through the soul, preparing, warning, comforting. This is why so seldom, or not at all, anything really surprises us, and why we have long and confidently hoped for the good, and trembled involuntarily before every evil."

From our special point of view there exist two categories of artists: those who reflect a sort of mirrored image and expression of the spirit of their time, and another more valuable class who are the fighting pioneers and liberators of mankind; those who truly carry the prospective function of mankind. Works of art accordingly affect mankind differently, relieving or liberating as has been said before, according to the prevalence of prospective or retrospective fixation. About the same may be said of dreams and their effect upon the individual; but the differences concern not only the separate persons, but also phases of the personal development of the individual. I shall demonstrate this assertion by examples later on. In this regard a man's series of dreams prove very valuable, as they represent a gradual devel-

opment of the current ethical conflict. We possess such a series of dreams given by Rosegger, which will be considered later on, and which shows clearly the value of a consideration of the dream problem in a larger connection. To Mensendieck we owe parallel researches into a series of works of art by the same poet (Hebbel, Wagner, etc.) which show a very similar result. These writings can actually be regarded as disindividualized and objectified milestones in the course of their author's development.

From the proposal of true definitions (to be explained later) it is at once apparent that the axiom of the dream as a wish fulfilment is, according to my conception, too indefinite and especially too one-sided, for it actually fails to embrace the important teleological side of the unconscious function. I regard the dream as a means of expression of the unconscious, as a true language. This dream speech is a " translation " of the worked up material of the unconscious, for the benefit of the conscious. By virtue of the special " permeability of the psychic diaphragm " in the sleeping state, this messenger, or better, this interpreter penetrates from the unconscious sphere into the conscious. This function of expression must be defined in greater detail. Dreams give autosymbolic representations of the actual condition of the libido, which are transmitted to the consciousness. The latter, as Freud has shown, acts merely as the " percepting " organ. The unconscious strives in the dream for adequate expression, I said; thereby is established a relation between the two autonomous psychic apparatuses. The unconscious utilizes many other means of expression for the same purpose: play, day phantasies, works of art, visions, neurotic symptoms, failures. Failure of accomplishment reveals rather that directly represents the unconscious, like the dream, which owing to its complicated structure possesses a special meaning. The relation of the dream to the work of art has already been emphasized and this idea, by the way, has already been formulated repeatedly, by Rank among others. I think the immediate future will shed more light on just this point.

We owe valuable data on this problem to those artists who have expressed themselves on the technique of their creations. C. Spitteler's contributions give us a very valuable affirmation of the close relation between the configuration of dreams and the production of works of art. Dream analyses have given me repeatedly the impression that genuine artistic talents lie latent

in all men, of which only little reaches manifestation. Freud has
laid down the axiom that the dream is the royal road which leads
into the unconscious. The previously mentioned definition of
the dream as an autosymbolic representation of the actual con-
dition of the libido fits very well with this. The mechanism
known under the formula " mindfulness of the presentable " and
which Bleuler has hesitated to accept, is therefore entitled to very
special attention. The prevalence of visual material in the dream-
structure is connected with the representability of the dream,
therefore also with the expression-function of the dream in the
psychic ménage.

After these introductory remarks, I shall now go on to my
actual task, to demonstrate by means of a detailed dream analysis
the ideas and formulas presented. This will give me opportunity
to raise several other points, for instance, the significance of the
manifesting dream content for the interpretation of the dream,
the relation of the dream to its psychic environment, also the
polyvalence of symbols and the meaning of the prospective direc-
tion in the analysis. Also I shall try, by means of a dream
analysis, to give a parallel between the interpretation of Freud
and his immediate pupils, as distinct from our own school, which
will give occasion for a defining of our mutual position.

I begin with a dream analysis:

EXAMPLE OF A DREAM ANALYSIS

Report Necessary to the Analysis.—The dreamer is a youth
of 18; he comes of a good family, of old stock which possesses,
however, numerous neurotic features. He grew up between a
father who is severe and violent in his demands, but, who taken
altogether is quite lovable, and a mother who is gentle, yielding,
sensitive, and cultured. As a boy he learned to avoid his father
very skilfully, and to escape from the responsibilities of life; in
the latter process he abused a natural gift for winning the affec-
tion of others. So he succeeded in being his own master, in
allowing his own desires and moods and interests to dominate his
life. Gradually tremendous gaps were noticed in his develop-
ment. There followed a chasing from one school to another.
After some years the youth emerged from these circumstances,
quite unimproved and extraordinarily ignorant. Psychoanalytic
treatment was then begun, side by side with suitable teaching and

education. Gradually the youth began to tackle this accumulated load of studies; after two years he was able to do a good piece of work in proper time. The dream analyzed later belongs to a time during the analysis when the youth had overcome the worst difficulties and the severest conflicts. In the patient's own written account the dream runs as follows:

" *I was with M.* [sister of the dreamer] *in the hall of a swimming bath. Only one gentleman and one lady were swimming there. I wanted to swim also with M. But as the hall was in a wrecked condition, I believed that no one was officially permitted to swim there. We succeeded, after some difficulty, in getting into the water which was at first very cold, I believe, but afterwards it seemed warm to me, anyway, I was not at all cold later. With a bicycle, we then rode further, to the lake* [in Zürich], *where we met O. and a man on horseback in a green uniform. He rode on a horse that had a beautiful blue coat. Before he came to the bridge he dismounted and showed the left foreleg of the blue horse to a boy, who suddenly appeared. Afterwards some gentleman spoke to us about Dr. D. and spoke of a check number which he had taken by mistake. I then offered to take it with me* [to the doctor who lived in a higher part of the town] *but he said he had already arranged something with his sister.*"

I woke up many times in between and was rather cross at not yet having dreamed anything. It was only after I was really awake that I noticed that I had been dreaming. I had paper and pencil under my pillow.

Associations.—According to the dreamer, the scene with the blue horse is the center of interest in the dream, the emotional interest is very strong here. (It is necessary to remark that the horse has much significance for the dreamer himself and for his whole environment.) I shall first take the boy's associations with the blue horse, and my own remarks are placed between brackets.

The blue horse is the color of the ice bird. There are no such horses. Monkeys have that color at the buttocks [he laughs] or in their faces. It was not beautiful! [strong affect] Miss von X. loves blue above all other colors [see below who is Miss von X.] Blue blood. [The dreamer as well as Miss von X. is of noble lineage.] Last evening we had a discussion on co-education; it was related how girls act as magnets for the boys in an

institute where the sexes are mixed; I wished to dream that
night [in order to get material for the psychoanalysis]. Just now
I suddenly think of "Harringa" or "Hanaschia," I don't know
why. Oh yes, "Harringa" is bound in blue [He refers to the
celebrated novel by Poppert which he had read with great in-
terest] but that is a different blue. The other name was not
Harraschid, but Harun-al-Raschid, now I know, about A.D. 800,
a splendid name isn't it? [the dreamer relates the contents of
the novel as follows, and in answer to a question which I put to
him at the end of the association work: The hero is a young
student who, whilst drunk, goes to a brothel where he contracts
a venereal disease and after many difficulties commits suicide by
drowning. Harun-al-Raschid is the favorite hero of the
dreamer's mother. He was an important Kaliph, who lived
about A.D. 800, contemporary with Charlemagne. The youth
shares his mother's admiration—splendid name!] Now I think
of Y [a comrade], who refers everything to the sexual, he is sup-
posed to have a sexual disease. I was so pleased with the dream.
[He seldom dreams.] Yesterday I masturbated and did not want
to tell of it."

I take the second chain of associations from the officer in the
green uniform—"Mr. von X. [father of Miss von X.] in his
uniform, he is in excellent circumstances, like a king in his king-
dom, he rules supreme and drives splendidly. He was my model
for a long time. I would also like to belong to a [military] regi-
ment of hunters—then one has a green uniform. Now I think
of the green meadow where I took an air bath; it was during a
walk with Miss v. X.; she had wished to see me so. We had been
permitted to go on a trip alone for one day and a half. We
managed all sorts of things. We slept together in the hotel; we
had a bad conscience; we feared we had betrayed ourselves. I
was to give a wrong name, L. von X., so that we might not be
taken for lovers [the lady was 12 years older than he; as a matter
of fact there was a liaison between them for some time]. The
conditions at the hotel were unfavorable."

The third series of associations I take from the incident
where the rider points to the *left* fore leg of the horse. It is
worthy of remark that the youth makes a mistake here and says
the *right* leg. He becomes thoughtful and says, finally, "No, it
is the left." We shall learn later on the reason for this mistake.
"The officer lifts the horse's leg and examines it. One of our

own horses is lame just now in the left fore leg. I would much like to be at home just now. I am actually home sick, I have a longing for the North, but I have to stay here and work. I don't like the teacher S., one makes slow progress with him. I have lately been lazy, have lost much time, am discontented. I lack strenuousness just now. A while ago, when I spoke of the night in the hotel, I kept back something, but I must tell it. I was particularly excited that night. Miss von X. had wished me to drink white wine, which I never do as a rule, but I did it in the end. I wasn't tipsy, but I was very much excited [which caused him much difficulty at that time]. I know from this how dangerous it is to drink, since then I have decided to give up drink. [Please recall the contents of the novel by Poppert—in the first series of associations]. I still remember our conversations [with me] on the alcohol problem."

· The following series is derived from the boy who appeared in the dream: "The boy is Karl, our stable boy. He likes to drink, he is a sullen fellow; he has several times made for me with the long whip when he was drunk. Now here is a childhood memory which I think I have never told. It was when I was a little fellow in my bath. I was sexually excited; mother was there. I told her the organ was so queer and hard, I wanted her to look at it. I think of the boy again; once he threatened me with his sword, because I had tattled about his behavior. He hit me with the flat of his sword, I was very mad, defended myself and threw a big flat iron on his feet; there was also a very ugly laundress at our place. [After a pause] A few days ago, during lessons, I suddenly felt a severe pain in the left ear. At once I had the idea, the teacher is going to give me a box on the ear. [But—nothing was the matter, the lesson was quite peaceful, this particular master had never punished him.] I thought I must defend myself." [The youth here motioned with his hand to one side, till he remembered that we were dealing with an entirely intra-psychic matter. It was with him a typical expression of his expectation of being badly treated by his father; an expectation that is especially active at times when he has not done his duty. See the third series of associations.]

Now we start a series of associations with Otto, with whom the dreamer has a conversation.

Periscope

Review of Neurology and Psychiatry

(Vol. XII, No. 2)

1. The Arcuate Nucleus in Man, the Anthropoid Apes, and the Microcephalic Idiot. A. NINIAN BRUCE, M.D.
2. The Parietal Area. GEOFFREY JEFFERSON, M.S. (Lond.), F.R.C.S.
3. Notes of a Case of Recurrent Paralysis of the Third Cranial Nerve. ROBERT A. FLEMING, M.D., F.R.C.P. (Edin.).

1. *The Arcuate Nucleus.*—It is a small, flattened mass of gray matter situated on the ventral surface of the medulla immediately above the decussation of the pyramids. The amount of gray matter varies. It is absent in anthropoid apes and in the microcephalic idiot. Transverse sections of the medulla of the human adult, the gorilla, the Haiman gibbon, the orang, the chimpanzee, and a microcephalic idiot, accompany the article.

2. *The Parietal Area.*—The rudiment of a parietal area is present in apes as low as pithecidæ, but it is not at all similar in structure to that of man. In the latter it consists most characteristically of four structurally different quadrants. These are separated from one another by the furrows which their differentiation has produced. Thus, the separation of the area into upper and lower portions of different structure gives rise to the sulcus parietalis horizontalis. Then the differentiation of each upper and lower portion into anterior and posterior structurally different areas, leads to the formation of the superior and inferior parietal sulci, which are, of course, vertically directed. It seems likely that the changes in the lower parietal area occur later in evolution than those in the upper. For the pithecidæ have a parietal cortex, small though it is, which somewhat resembles that of the superior parietal cortex of man. The parietal association area widely separates the areas of vision and common sensation from one another, and its most characteristic feature in man is the great development of its lower part, *i. e.*, the angular and supra-marginal gyri. The typical parietal furrows can only appear in animals whose cortical structure resembles that of man. It is quite uncommon to find a well-formed post-parietal gyrus. Usually it is absent. The sulcus that it is said to be thrown around is not the end of the commonly much broken up middle temporal sulcus, but the anterior occipital. This last is a limiting sulcus with a cortex of different structure in front of and behind it. It is obvious, therefore, that the post-parietal can never be as constant as the other two arching gyri for the reason that it could not be homogeneous in structure. The anterior occipital sulcus is the boundary line between the parietal area and occipitalis. The sulcus postcentrales, *sup. et. inf.*, separate the general sensory area from the parietal association area, whilst this last is divided into four quadrants by its own special sulci. In the inferior parietal area there are two sulci. Of these, one, the s. pariet. inf., is a *limiting* sulcus separating the anterior and posterior parts of the inferior parietal area, whilst the other, the ramus ascendens of the sup. temporal sulcus, is an *axial* furrow. A descriptive figure accompanies the article.

3. *Notes of a Case of Recurrent Paralysis.*—The patient was a school girl of 12. Family history negative. Personal history included measles, abscess of both ears, whooping cough and chickenpox. Had three attacks of left third nerve paralysis, from each of which there was complete recovery without treatment. The attacks were preceded by head-shaking, or twitching, and severe headache, which was mostly confined to the region of the left eye. Eight months separated the second from the first attack; and two years and four months the third from the second attack. There was never any vomiting, but in each attack there were characteristic ptosis, double vision, with vertigo, dilated pupil, paralysis of accommodation, and complete paralysis of the third nerve oculo-motor muscles.

(Vol. XII, No. 3)

1. Labyrinth Suppuration. J. S. Fraser.
2. Iscovesco's Experimental Researches on Lipoids of Organs. Leonard J. Kidd.

1. *Labyrinth Suppuration.*—The title is misleading. The article comprises a lengthy review of the development and anatomy of the labyrinth; its physiology; the Bárány and other clinical methods of testing the vestibular apparatus; the pathology of labyrinthitis; and the clinical aspect and treatment of labyrinthitis in its various forms. The article does not lend itself to brief abstracting.

2. *Researches on Lipoids of Organs.*—Iscovesco's researches are summarized as follows: (1) Bodily growth in young animals is increased and accelerated by special lipoids extracted from the pancreas, thyroid, ovary, testis, anterior pituitary lobe, and cod-liver oil, and in rabbits aged 14 months by the adrenal medullary lipoid; (2) the thyroid is hypertrophied by the lipoids of the thyroid and the ovary, and slightly by testis; (3) the heart by the thyroid, anterior pituitary, medullary adrenal, and the II. Bd hepatic lipoid; (4) the ovary by the ovarian, thyroidal, and medullary adrenal; (5) the uterus is hypertrophied by the ovarian and thyroidal, and was diminished in weight (in six rabbits) by the medullary adrenal; (6) the kidneys are either hypertrophied or show increased activity by the use of the thyroidal (males only), testis slightly, anterior, pituitary, cortical adrenal (chiefly in males), the hepatic lipoid (II. Bd) slightly, but by the hepatic lecithide much more; (7) the liver by the pancreatic, anterior pituitary, cortical adrenal, and special hepatic lipoid (II. Bd); (8) the adrenals by the cortical adrenal (markedly), medullary adrenal (slightly and mainly its medulla); (9) the skin, fur, and cutaneous glands strikingly by the cortical adrenal (sweating also in man); (10) the appetite is increased by the pancreatic, anterior pituitary, and the special hepatic lechithide which is identical, chemically, physiologically, and therapeutically, with the lecithide extracted from commercial cod-liver oil; (11) the testes are hypertrophied by the thyroidal lipoid and testis lipoid; (12) the lungs by the pulmo-stimulant lecithides of (*a*) liver and (*b*) cod-liver oil. Changes in other organs, such as the spleen or rectum, etc., are either slight or *nil*, so far, at any rate, as their post-mortem weights are concerned. There are certain outstanding features of extreme interest and importance in Iscovesco's careful studies: (1) The production in rabbits of a veritable Graves-Basedow disease (not to be distinguished from the human disease) by means of a thyroidal lipoid; (2) the absence of any genital changes in either sex from the use of the anterior pituitary lipoid.

(Vol. XII, No. 4)

1. The Neural Atrophy of the Muscles of the Hand, without Sensory Disturbances.   J. RAMSAY HUNT.
2. On the Technique of Nerve Palpation by Nerve "Friction."   EDGAR F. CYRIAX.

1. *Neural Atrophy of the Hand.*—This is a further study of compression neuritis of the thenar branch of the median nerve and the deep palmar branch of the ulnar nerve, by the same writer.   The types of neural atrophy of the hand to which reference is made may resemble more or less closely certain of the myelopathies and myopathies beginning in the small muscles of the thenar, hypothenar, or interosseous regions of the hand, but also present points of differentiation.

This peculiar form of neural atrophy results from a neuritis or compression of purely motor branches of the ulnar and median nerves, and may be divided into a *thenar* and *hypothenar* type.

In the *thenar group* the atrophy is limited to the muscles of the thenar eminence supplied by the median nerve, and is the result of compression of the thenar branch as it passes beneath the anterior annular ligament of the wrist.

The *hypothenar group* is characterized by paralysis with atrophy of all the small muscles of the hand supplied by the ulnar nerve, and results from compression of the deep volar branch as it passes between the tendons of origin of the short abductor and the short flexor of the little finger.

Both of the compressed nerves are purely motor in character, which explains the occurrence of neural atrophy without disturbances of sensibility in their respective distributions.

Two clinical cases are presented.   The first is that of a clothes presser developing the hypothenar type; the second was a floor scrubber and brass polisher who developed the thenar type.

The differentiation of the thenar and hypothenar types of neural atrophy of the hand from the other groups of compression neuritis, professional palsies and occupation atrophies occurring in the hand, have been discussed at length by Hunt in previous studies of this subject.   Briefly stated, the essential points of difference are, the absence of sensory symptoms in the affected neural distribution and the complete paralysis of all the intrinsic muscles of the hand supplied by the thenar nerve (thenar type) and the deep palmar nerve (hypothenar type).

A complete paralysis in an entire neural distribution with degenerative reactions would rule out conclusively those forms of occupation palsy which have been ascribed to degeneration of the peripheral motor terminals by muscular compression (Gessler), as well as those professional atrophies assumed to be of myositic or myopathic origin.

Certain types of spinal atrophy beginning in the small muscles of the hand may cause uncertainty in diagnosis in the earlier stage when atrophy is just beginning.   But the absence of a sharply defined limitation to a neural distribution and the progressive tendency, the presence of fibrillary twitchings and the later involvement of the other muscles of the forearm, with alterations of the tendon reflexes, serve very effectually to indicate its medullary origin.

2. *Technique of Nerve Palpation.*—The method described is the therapeutic one, whose existence in its present form is ascribed to H. Kellgren. The nerve should be easy of access, and the muscles, fasciæ, etc., that lie superficial to the nerve should be relaxed.   The medical man then places

one or more digits on or near the nerve to be examined. Either the nail itself, or the nail together with the soft part, or the soft part without the nail, of the forefinger or second finger, less commonly of the thumb, is employed. The friction is executed by drawing the tip of the digit, together with the superficial structures, across the nerve at right angles to its long axis, a certain amount of pressure being applied meanwhile. The amount of pressure should be the lightest compatible with the effect desired; for example, a friction applied to the facial nerve as it winds round the ascending ramus of the jaw with a pressure equivalent to about one ounce, is sufficient in many cases to enable the operator clearly to define the position and size of the nerve, and to produce, from the patient's point of view, a mild but distinctly stimulatory effect. As soon as the nerve has been traversed, the pressure is relaxed. The digit may then either execute a friction in the reverse direction or be brought back to its original position, and execute another in the same direction. A certain amount of speed is necessary; on the average it may be said that a single friction occupies from one fifth to one half a second.

Care should be taken to avoid:

1. Applying the pressure too long before beginning the friction, and not relaxing it immediately after completing it.

2. Applying too great a pressure.

3. Executing the friction too slowly.

Each of the three above faults results in a dull aching sensation, quite unlike the stimulatory one that results if the friction is correctly executed.

4. Not locating the nerve. The mere causing of pain is not an indication that the main nerve has been reached.

5. Moving across the superficial structures, not together with them across the nerve.

From the purely physical point of view, the following major effects are induced by nerve frictions when correctly executed. Changes arise in the length, thickness, shape, and anatomical position of the nerve thus treated, followed by a rapid return to the normal.

(Vol. XII, No. 5)

On the Mechanism of Some Cases of Manic-Depressive Excitement. C. MACFIE CAMPBELL.

Cases of mental disorder should be studied not only from the point of formal differentiation, but also with the aim of understanding the content of the disorder, the meaning of the morbid utterances and actions, the fundamental significance of the distorted adaptation of the patient. Such an analysis leads down to dynamic factors at the roots of the individual's activity. For the manic-depressive group this form of analysis is more or less new. Several cases are described in which an analysis of this more intensive kind has been made and some light is thrown on the mechanism of manic excitement. We reproduce the writer's summary, as an abstract of the entire article is practically impossible.

In many cases of manic-depressive excitement the onset of the attack becomes intelligible in the light of a careful reconstruction of the whole situation out of which the attack has developed.

The difficulty of adjustment which leads to the manic attack in these cases is much less deeply seated than in dementia præcox and allied conditions; the conflict is much more clearly realized by the patient, the flight into the psychosis coincides with the relaxation of efforts which are

recognized as inadequate to deal with the actual situation, the cessation of the struggle permits the frank expression of repressed elements. The elated mood and exuberant activity of the manic patient are thus partly explained.

It is important to study closely the content of the utterances of the manic patient in order to understand the meaning of the situation leading to the attack; this line of investigation includes an accurate estimate of the equilibrium of forces which make up the patient's personality, and involves a thorough study of the individual's development.

A thorough review of the above factors may put the patient in a better position with regard to the possibility of avoiding further attacks.

(Vol. XII, No. 8)

Drop-Methods of Counting the Cells of the Cerebro-Spinal Fluid—the Relation of the Cell-Count to the Wassermann Reaction. R. Donald.

From this lengthy article we reproduce the author's own summary. The drop-film method of counting the cells of cerebrospinal fluid is described, and more than 260 cell-counts, from cases dealt with by Drs. McIntosh, Fildes, Head and Fearnsides, are discussed in connection with extensive tables lent by those authors to show the quantitative Wassermann test, done two to five times on the c.s.f. simultaneously with the cell-count, and oftener on the serum, in a number of cases in various stages of treatment.

The method avoids centrifuging, which is found to cause loss of some cells, especially of the swollen degenerated cells. (These exist in some freshly drawn c.s.fs., and they develop from unswollen cells in c.s.f. kept for a day or two.) Also it avoids the addition of alcohol or of acetic acid, substances that destroy the red cells. (Red cells, whether due to the puncture or due to previous hemorrhage are, as Rous insisted, to be demonstrated and allowed for.) No special apparatus is used. The preparations are permanent, and may be easily multiple, e. g., for class purposes.

On each of any number of ordinary slides a couple of separate small drops of the c.s.f. are deposited by a pipette. The slides are then dried, heat-fixed, dipped in dilute collodion, and dried again. Thus are obtained drop-films that are practically collodion sections at most only one dried cell in thickness. These films, stained, c. g., Giemsa, or Leishman, and Unna-Pappenheim, and mounted in clear soft paraffin, give, with the aid of a mechanical stage, at once clear cell-pictures and convenient accurate cell-counts, without the loss of a single bacterium. Staining for Gram-positive bacteria or for tubercle bacilli may be done.

At any stage after the drying of the drop the process may be interrupted, at the worker's convenience.

When filed the permanent preparations give a valuable record of the cytological course of the case.

The cases dealt with are marked off into four groups by the serum-W.R. and the cell-count. The main interest centers in the group, with serum-W.R. positive and with pleocytosis. Only this group has the c.s.f.-W.R. positive.

In many of the patients at the time of first observation it is impossible to say whether the condition is to be called "cerebrospinal syphilis," and a hopeful prognosis given, or whether it belongs, or may presently, especially if no treatment now be applied, belong to the clinical group "parasyphilis," with its relatively hopeless prognosis. Not by the presence or

by the degree of pleocytosis—any more than by the presence or by the strength of the W.R. in c.s.f. or in serum—but only by their behavior under treatment do these cases show up as belonging to the one type or to the other. The potency, in many of the cases, of treatment by intravenous injections of neosalvarsan is indicated in the tables of successive cell-counts and Wassermann tests.

As the published tables show, the cell-count is a test that, for significance and reliability, is a worthy coöperator with the W.R. Indeed it often gives earlier than the W.R. (1) warning of meningeal affection, and (2) after treatment, indication of improvement.

The pleocytosis-producing substance is shown to be distinct from the Wassermann substance.

A description is given of a simple microscope lamp, which has shown itself of value in rapid qualitative cell-counts, with moderate powers.

Besides the mainly-used drop-film method, there is described a simple drop-chamber method, using ordinary slides and cover glasses, and suitable for dark-ground examination of unstained cells.

(Vol. XII, No. 9)

The Alleged Sensory Cutaneous Zone of the Facial Nerve of Man. LEONARD J. KIDD.

1. There is no anatomical or experimental evidence of the existence of a cutaneous sensory zone of the facial nerve in any vertebrate group above the *Cyclostomata*.

2. Clinical studies prove that the human facial nerve has no sensory cutaneous zone on the auricle.

3. The clinico-pathological evidence brought forward by Ramsay Hunt and his numerous followers in favor of the cutaneous facialis hypothesis breaks down completely on a searching critical scrutiny, as is set forth exhaustively in section 4 of this paper.

4. It is unknown whether the petrosal IX ganglion contributes any sensory cutaneous fibers, by way of the auricular branch of the vagus nerve, to the auricle

5. Some of the experimental methods by which the question of the existence of a sensory cutaneous supply of the mammalian facial nerve can be tested are outlined.

C. E. ATWOOD (New York).

MISCELLANEOUS

THE NERVOUS SYSTEM AND CUTANEOUS PIGMENTATION. F. Nehl. (Zeit. f. klin. Med., Vol. 81, Nos. 1 and 2.)

A number of years ago it was learned that one of the important sources of the coloring matter of the skin is an end-product of protein disintegration in the intestine, namely tyrosine. It was thought that all the colors of the butterfly's wing for instance are similarly derived from decomposition products. The pigment cells of the skin are subject to many influences, not only chemical, but also thermic, actinic and mechanical; and are developed to a higher degree of complexity in the lower orders of life, such as the fishes and amphibia. The fact that the latter can in many instances adapt their cutaneous coloration to that of the environment indicates a close relationship between the nervous system and the pigmentary apparatus of the integument. That such a relationship, though less pro-

nounced, exists in human beings is indicated in the instances of changes in skin coloring arising in the course of nervous diseases, and in the conspicuous examples of graying of the hair resulting from fright or intense mental strain. Nehl makes these observations the point of departure for a study of the vegetative nervous system in its relation to skin changes and which, read in the light of constant emotional complex reactions in view of Freud's work, serves to throw much light on the anatomical substratum for many hysterical conversion changes not only of the skin but of other organic changes as well.

He points out that the instances of so-called sudden graying of the hair as the result of anxiety must be regarded critically. In these cases, according to Landais, there seems to occur, not a disappearance of pigment, but an accumulation of innumerable minute bubbles of air in the hair. The premature graying of the hair associated with prolonged grief and worry has been explained on the basis of a disturbance in the general physical condition of the individual. In this instance there are associated with the graying of the hair a general emaciation, a reduction in the hemoglobin-content in the blood, and a loss of tonus in the skin and in the body musculature. There are however instances of the direct effect of changes in the nervous system upon the cutaneous pigmentation. Thus, canities is frequently observed in the territory supplied by a particular nerve. The neural causation is especially manifest if local neuralgic pains are present, as in idiopathic vitiligo, and in the case of the pigmentary atrophic spots of leprosy in which there is a reduction in sensibility in the affected cutaneous areas. The pigmentary anomalies of segmental pigmented nevi and of congenital segmental albinism are attributed to disturbances in the development of the cutaneous cells rather than to any neurological factor. The question whether the pigmentation of Addison's disease has anything to do with the nervous system has not yet been solved. Undoubtedly, however, the suprarenals with their innervation by the vegetative nervous system have some influence upon the cutaneous pigmentation. That the potent factor is the vegetative nervous system is also indicated in the instances of pigmentation occurring in exophthalmic goiter, diseases of the ovaries, and pellagra, in all of which the autonomic nervous system is involved. The pigmentation observed in scleroderma and facial hemiatrophy, and frequently confined to the areas of distribution of particular nerves, suggests that the sympathetic fibers in the peripheral nerves are the ones responsible for the pigmentary changes. At any rate, in these conditions there are neither motor nor sensory disturbances. Moreover, it has been shown that sections of sympathetic nerve fibers may give rise to a disappearance of pigment from the skin, as in the cases of unilateral graying of the hair following lesions of the cervical sympathetic, and of heterochromia of the iris occurring after resection of the upper cervical ganglion. It is quite probable, therefore, that prolonged grief and worry may through the agency of the autonomic nervous system give rise to premature graying of the hair.   JELLIFFE.

BERIBERI AND SCURVY. S. T. Darling. (Journal A. M. A., Oct. 10, 1914.)

This author reports observations on scurvy largely made in South Africa. A number of postmortems were made and some pathologic material collected. He was struck at the first necropsy by the remarkable appearance of the heart which suggested the picture of right-sided hypertrophy in beriberi. Since his return Darling has microscopically examined the vagus and the heart muscle of some of the cases and found some of the

same types of degeneration as seen in beriberi. Following up the observations of scurvy a number of other studies were made which show family relationships between scurvy, a classical example of the food deficiency of cachexia and beriberi, and also others of the group of dietetic cachexia. At one extreme is rickets, a type of pure "osteocachexia," to use Watkins-Pitchford's term. At the other extreme a pure neuro-cachexia such as polyneuritis gallinarum. Between these two types are scurvy, infantile scurvy, the experimental scurvy of guinea-pigs, ship beriberi, beriberi (two or more types), infantile beriberi and epidemic dropsy and neuritis. All of these types are briefly described and a table showing their affinities and pathologic features given. Darling quotes the classification of Funk, who also includes pellagra in this group of nutritional diseases of deficiency of vitamins. In this Darling thinks he is unwise. Darling's first impression of scurvy in South Africa was that the disease was an infection but that rapidly gave way to a confirmed opinion that it was due to dietary errors. An interesting feature of the disease was that the tropical negro workmen had the disease of a more severe type and with a greater mortality than the Cape Colony natives. He emphasizes the occurrence of the cardiac lesion above mentioned, and says in conclusion : " The striking excentric hypertrophy and dilatation of the right heart with extensive fatty degeneration of the same musculature, and left heart remaining apparently normal, and the severe degeneration of the vagus nerve described here from several fatal cases of scurvy from the Rand furnish new and additional facts which show the intimate relationship between scurvy and beriberi as to etiology. The affinities between these two diseases and certain other cachexias lends emphasis to the opinion that they are all the result of the continued use of a one-sided and deficient diet."

DRUGS USED IN MENTAL DISORDERS. D. Gregg. (Bost. Med. and Surg. J., Sept. 24, 1914.)

The author states that the problems in medication at mental hospitals lie in the refinement of the use of drugs for purposes of elimination in decreasing autointoxication, and in rectifying pathological action of the internal secretions. In eliminating substances from the body there is ample chance for skillful medication. There are cases needing mechanical relief by enemata, cases needing to have the fluids drained off by purges, and cases that are already desiccated and need more fluid, although still requiring relief from intestinal stasis. There are acute cases that may even need to be bled to reduce their fluids, or to have lumbar punctures done to lessen an excessive amount of cerebrospinal fluid. There are cases where autointoxication arises from infected teeth or tonsils, or from misplaced or adherent intestines. There are cases where presumably the thyroid, thymus, or pituitary glands, or the reproductive organs, are not functioning properly. In all these directions lie problems in medication for cases in mental hospitals. General hospitals have many lessons to learn from mental hospitals, especially in the management of the deliria. Not the least of these lessons is that depressants, stimulants, and restraint lessen, whereas baths, packs, and elimination greatly increase a patient's chance for recovery.

Book Reviews

SEROLOGY OF NERVOUS AND MENTAL DISEASES. By D. M. Kaplan, M.D., Director of Clinical and Research Laboratories of the Neurological Institute, New York City. Octavo of 346 pages, illustrated. Philadelphia and London. W. B. Saunders Company. Cloth, $3.50 net.

Quincke lumbar puncture and Wassermann's serum investigations have been of more signal service in the study of organic nervous and mental disorders than almost any other procedures. They have enabled an entirely new alignment to be made and have converted many a quagmire of ignorance into an orderly labyrinth with well-illuminated guides.

Dr. Kaplan has done a signal service in bringing this work together and furthermore has made a lasting contribution to the world's medical literature.

It is not necessary to tell what the book is. Its title is sufficiently explanatory; it is a privilege to say that it is well done and shows the results of conscientious labor and marked devotion to science.

To the neurologist or psychiatrist who does not himself do serological work this book should specially appeal. It enables him to see what it is necessary to know in order to do conscientious therapy. It will lead him away from hazy conceptions of that enormously protean and widespread disorder syphilis of the nervous system, into definite paths of how to recognize and attack the same. No longer can one hydrotherapy and electrotherapy the "neurasthenia" of early cerebral syphilis, and remain blind to facts. With the information which Kaplan's work shows is at our command we can immediately start real therapy.

JELLIFFE.

HISTORY OF MEDICINE. By Fielding H. Garrison, M.D. W. B. Saunders and Company. Philadelphia and London. $6.00.

This is a work of American scholarship which in its particular field stands preëminent. Medical historians with us have been conspicuous by their absence and it is with a sincere sense of congratulation that this work is to be welcomed.

Furthermore even in the epitomes which have been published the matter has been as dry as the dead bones of the medically great, but again here is a novelty. A living book whose author has clothed the dead ideas and with that sympathy born of comprehension, made the past masters step out into the present as living.

Dr. Garrison has had, furthermore, that most fortunate attitude that the history of medicine is only a part of the broader human picture and thus he has given us a really unique work which should be one of those indispensable parts of every man's library equipment. When it is realized that, much like Cervantes' immortal hero, most of us, and physicians, one might say specially, beat the air, chasing windmills, because of a lack of knowledge of the evolution of medical symbols, it may readily be seen that a work of this kind should be a foundation stone of every physician's intellectual storehouse.

There is little question that Dr. Garrison's work is the most attractive book of its kind that has appeared in years.

<div align="right">JELLIFFE.</div>

DIAGNOSTIC SYMPTOMS IN NERVOUS DISEASE. By E. L. Hunt, M.D. W. B. Saunders and Company.

Works of this kind have to stand a special kind of criticism. To be really reliable and satisfactory they have to be so complete as to be beyond the student's reach. Such an ideal is Dejerine's "Semiologie." Short compends have to be so scrappy as to be misleading and sometimes worse than useless.

Dr. Hunt has steered a happy course between the two extremes and in small compass has presented a useful guide for the examination of nervous patients. We wish it success that it may grow and be even more useful.

<div align="right">JELLIFFE.</div>

The Journal

OF

Nervous and Mental Disease

Original Articles

THE FEEBLY INHIBITED. I. VIOLENT TEMPER AND ITS INHERITANCE

By Charles B. Davenport

CARNEGIE INSTITUTION OF WASHINGTON

A study has been made of 165 family histories of wayward girls in state institutions. The results of this make a mass of manuscript too formidable for publication at one time and so the method has been adopted of breaking it up into a series of studies of which each is to deal with one of the more important points discovered.

A. Statement of the Problem.—The general problem which has been studied is: In how far does heredity play a rôle in those traits, usually of a highly "emotional" sort, that lie at the basis of criminal behavior? The special problem of this paper is the classification of the cases of violent temper occurring in these families and the determination of their hereditary basis, if any.

B. Method.—The general method employed is that of research by a field worker into the history of the families concerned. Visits are paid to the homes of the patients and as many as possible of the family examined as to their emotional traits. The reports upon the findings of the field worker are used for the study of one trait at a time and such study has led to the formulation of an hypothesis as to the method of inheritance of some of them. If further inquiries appear to be necessary such are made by a

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special investigator, who is sent out to discover, without prejudice, the facts as to the emotional life of the persons about whom information is required. If the facts discovered are found to agree with the hypothesis, that naturally gives assurance of the truth of the hypothesis; if the new facts are in disagreement the hypothesis is abandoned.

Attention is drawn to the value of field work for the study of emotional traits. The reactions—the behavior—of a person in the artificial environment of an institution give a wholly inadequate insight into his true emotional makeup. The best criterion of a person's emotional traits is his reactions in the world in which he has ordinarily to live. It is of relatively little importance that an adolescent boy or girl behaves well in an institution; the practical question is, Is he capable of moral control in the world of affairs? The field worker discovers the individual's reactions in his natural environment—whether that environment be better or worse.

In addition to the 165 original family histories made by a dozen different investigators, other material on deposit at the Eugenics Record Office has been occasionally drawn upon; this includes certain studies made on the family history of disturbed patients at Kings Park State Hospital and supplied for this study through the kindness of Dr. W. A. Macy, Superintendent.

C. Nomenclature.—In the data relating to many of the 165 families under consideration there is mention of " quick temper " or " violent temper "; and so often has the term recurred in describing different members of a family that it has seemed desirable to determine whether a law of its recurrence in members of a family could be established. Consequently the entire collection of reports was gone over and every case of violent temper found was recorded. Certain other phrases were also recorded such as " ungovernable temper," " bad temper," " tantrums," " fits " or " spells " of temper, " violent passion," " rage spells," etc. In a few cases the behavior of a person in a fit of temper is described fully without being named and these cases are also included. Table I gives the frequency of the different terms related to bad temper as they occur in the abstracts of the family histories. Not all of the individuals to which these terms were applied were included in our study as we shall see directly. In a few cases terms are given which do not obviously indicate a fit of bad temper but they

are included because the context indicated that they probably belong to this category.

In the 165 families some individual was found in 79 to whom one of the foregoing terms was ascribed as being a leading distinctive feature; this is about 48 per cent. of all. And of these 79 family histories bad temper of some sort is described in more than one individual in 49, or about two-thirds. Of the other 30 histories it cannot be said that they show no evidence of heredity for, first of all, many of them are very fragmentary, and secondly, in most of the others the single case of bad temper is recorded for an individual of a remote generation who left no excitable descendants and of whose ancestors no detailed information could be obtained. This study has included only families with more than one case of violent temper.

D. Classification.—On considering all of the fraternities that contain a person who is subject to violent disturbances of mood it very soon appeared that they fall into three groups, as follows:

(*a*) With at least one epileptic person in the pedigree.

(*b*) With insane, but not epileptic, close relatives.

(*c*) With neither insane nor epileptic relatives.

It is proposed to treat separately the record of bad temper in these three sets of families.

(*a*) *Outbursts of Bad Temper in Families with Epilepsy.* (Table II.)—In this group are placed all family histories showing clear cases of epilepsy among fairly close relatives of the propositus (or person with whom the pedigree starts). There are one or two cases with *remote* epileptic relatives placed in the class *b* because the majority of near relatives are " insane."

In this group, in a number of cases, the patient shows both epilepsy and bad temper and there are other members of the family who show these traits separately or together. I place the clearest and fullest cases first, the more fragmentary toward the end.

First, I will attempt a sort of composite portrait of the behavior of violent-tempered persons who belong to the families with epilepsy.

" Patient early developed convulsions and showed signs of an ungovernable temper; even as a baby she would beat her head against the floor. She was tantalizing and would get into tantrums, when she would slap at members of the household, pull their hair, hit them viciously, and bite them, and even pull her own hair and scratch herself."

Actually we get such accounts as the following:

(51) At housework her vicious temper got her into much trouble; in a fit of temper she hit her mistress in the abdomen so that the lady died of the injuries.

(42) Slapped at the members of the household, pulled their hair and once threatened suicide. At the Institution in one violent fit of temper she attacked the officer with a broom, and in another hit the officer in the breast; in another outburst she scratched and bit at the officer, kicked out panels of doors, swore and used the vilest language imaginable.

(36) In a fit of passion patient beats her little brother, whom she is rearing, over the head until he is nearly crazy.

(26) The patient's mother's brother in his violent temper throws things and will kick his 15-year old daughter; his older daughter has a very quick temper, throws her little brother around when angry and is remorseful after the fit.

(70) Patient enjoyed the discomfort of others; would strike, throw things and spit at her brother; would pull her own hair and scratch herself; after punishment would cry for a long time.

(92) When angry will throw anything she happens to have near at hand at the one who offended her.

(11) At state home would fly into a passion under the least provocation, pounding, screaming, throwing things around; again struck another girl with a chair, threatened and attempted suicide. She has an epileptic cousin who has a bad temper and throws things at any one who offends her.

(29) The father's mother's father had a very violent temper, once had a quarrel with a neighbor, waylaid him and threw a stone at his head.

(50) Patient is described by the police as a "Holy Terror" and an awful fighter, when drunk, so that it took six men to bring her in; has persecutory delusions.

(53) Brother was once in jail for threatening to kill his mother.

The outbursts of temper that occur in these families associated with epilepsy are thus characterized by sudden onset in persons of a generally disagreeable disposition; and by tendency to assault others, and occasionally to hurt one's self and to destroy things.

The "epileptic temper" has been long recognized. Kraepelin (1899) states that "it suddenly appears of a morning there as if flown in and in a few days it is gone." Raecke (1903, p. 97) regards as an "equivalent" of epilepsy an aroused temper which usually has a silly-foolish (läppisch-albernen) cast, especially in the children, and there is a strong tendency to outbursts of anger and brutal treatment. The following episode is typical: "A 20-

year old epileptic girl, who usually lay torpid under the bed spread, appeared, one morning, strangely elated, laughed, sang, became disorderly, went to other beds (in the ward) and pulled the hair of the other patients. When she was restrained she fell into a senseless rage, attempted to break the window, spit, struck, roared, danced on the floor and heaped abuse on everything about her. Placed in a separate room she calmed down in a few hours and appeared to have no memory of her acts."

Another case is given by Hennes (1910, p. 95). The patient has periodic outbreaks of temper without cause. In the morning the temper is already present and disappears during the day. Patient has a general irritability.

Ribot, (1896, p. 223) describes the epileptic temper thus:

" Even in periods of calm, the universally noted psychological traits reveal a sombre, morose, irritable, but, above all, irascible disposition—the 'choleric' character *par excellence*. In the paroxysmal period, we find the symptoms of anger carried to extremity; ' The patient ' (I borrow Schüler's description) ' throws himself on his surroundings with a blind rage, a bestial fury; he spits, strikes, bites, breaks everything he can reach; shouts and storms. His face is congested, his pupils are sometimes contracted, sometimes—and more frequently—dilated, the conjunctivæ are much injected, the look fixed, there is abundant salivation, pulsation of the carotid, acceleration of the pulse.' . . . In the ensuing period of stupor, the acts of blind violence usually leave no trace in the memory."

Binswanger (1899, p. 281) describes the major attacks of psychic epilepsy thus: " They usually break out quickly after a short prodromal period; and differ from the minor attacks by the violent motor discharges which develop, clinically, on the basis of great mixed emotions of anger and anxiety, frightful, threatening hallucinations. A blind impulse to destruction characterizes the clinical picture. Violence, directed towards the life of the patient or that of others, makes the attacks so frequently the starting point of legal investigation."

It will thus be seen that much of the behavior in our cases is typical of the epileptic temper.

(*b*) *Outbreaks of Bad Temper in Families with Mania.*—Second, we may consider the 21 histories of temper in families with manic-depressive insanity (or allied psychoses).

In these cases we get such descriptions of temper as the following:

(154) Had angry spells when she was abusive to everyone and was troubled by melancholia and hysteria. Delusions arose and increased; her father's father had spells of anger, usually followed by long depression.

(7) Patient had an ungovernable temper; at the time of an attack would break things quite beyond her ordinary strength and would lash herself into an almost insane fury; these attacks would be followed by deep melancholia; often threatened suicide.

(54) Patient has violent attacks of temper. Once when asked by the matron to clean the windows she began, "Now you've loosed the devil in me." She told the matron she hated her. She swore and cursed and ran around the house, banging doors and making a great disturbance. A few hours after this, penitent; asserts that at such times she does not know what she is doing.

(117) Patient has periods of calm and periods of excitability, when she loses all self-control. She could go to a darkened room for hours or a day or two at a time and stay quite alone and not want anybody to speak to or bother her. At other times she would be excited.

(153) Has spells when she is easily excited and will fly into a rage and tear things up.

From Kings Park State Hospital come the following personal histories of periodic tempers in persons classified as having a manic-depressive psychosis.

W, ♀, quick tempered and quarrelsome. On her mother declining to give her more money she became very angry and excited, threatened to kill herself and her mother and secluded herself for 3 days. Her episodes (at the hospital) did not last long; she was very excited and assaultive.

R, ♀, has been in the hospital 6 times. At one time became somewhat irritable and depressed, insolent and abusive on the slightest provocation.

D, ♂, an efficient, educated man. Has always been nervous and irritable, difficult to get along with. Has been at the hospital several different times, usually showing restlessness and violence with depression followed by elation.

T, ♂, in attacks is very much elated, excitable, nervous and irritable and talks irrationally; at the hospital has been assaultive and resistive.

S, ♀, highly erotic; quarreled with husband.

Of the foregoing examples, Cases 154, and R and D of Kings Park seem to be the most typical of this class. A composite picture would be something like this.

Patient has angry spells when she is much excited (with or without elation) and under these circumstances is often irritable, abusive, even assaultive and sometimes she storms, swears and

makes a great disturbance; becomes easily discouraged, gets depressed; contemplates suicide.

Ribot (1896, p. 223) thus characterizes the maniacal anger "After a period of incubation during which melancholia prevails, a violent reaction takes place in sudden paroxysms. These vary from simple excitement to fury. There is a flood of ideas and an expansive humor."

(*c*) *Hysterical Outbreaks of Temper.*—We now come to the remaining cases of violent temper, those without clear evidence of epilepsy or manic depressive insanity in near relatives. This negative class may, in some cases, be due to the limits of the pedigrees; but, on the other hand, cases 66, 103, 40, etc., are fairly satisfactorily extensive, and would show the presence of epilepsy or mania if there were any among the near relatives.

In these cases we get such descriptions of temper as the following:

(46) Patient got into violent quarrels. If corrected, lay down on floor and refused to do anything. Returned to the re-receiving cottage she did well for two months, but then showed violent fits of temper. Had two other paroxysms which coincided with her menstrual periods—looked wild, sang, swore and smashed furniture, so that she had to be forcibly restrained. On the last occasion the fit lasted 36 hours. Two months later, just before menstrual period, she had another wild outburst; when reproved, she threatened matron, but in a moment burst into a storm of tears and showed herself extremely repentant.

(103) Patient's ugly periods would generally come at the time of menstruation. They would be two or three days in gathering; then would come the crisis and it would take a day or two to calm with perhaps a little rebound before it was all over.

(91) Patient, at times, becomes very restless, very excited and emotional, bursting finally into a violent temper. During one of these attacks she banged the furniture about, pounded the door of her room, smashed the window and threw things out.

(40) Patient in her sudden fits of anger hurls anything at the "offender"; is subject to quick changes in her likes and dislikes and it is impossible to count on her mood or her behavior two minutes together. Is violent in her likes and dislikes and quick to change without any reason. "Has no stability in her." On a Friday had an outburst when she sang, whistled, called bad names; and renewed outbursts on Saturday and Sunday. When restrained she broke furniture, threatened lives and made all sorts of impossible demands. At a woman's prison she behaved better because she "had to." Her sister also had a spell (at the institution) of banging doors and striking without provocation. Their

mother has a similar violent temper and suffers from frequent headaches.

(58) The patient's half sister, when crossed, lost all control, cursed and swore and made threats of killing. The fits were followed by remorse. Placed out, the fits came on and she struck her employer in the face.

(25) Patient, in an attack of temper, reviles every one, threatens to kill herself or others; her sister in a tantrum threw a lighted lamp at her paramour.

(61) Father's sister has violent outbursts of temper about once a month, when she is a regular devil.

(55) Patient, when things were not going as she wished, would fly into such a rage that she seemed at first sight insane. She had morbid spells about once a month when she would sit and mope and refuse food for 3 days. There is no family history of this case.

An attempt at a composite picture would go something like this:

Patient shows, especially at the menstrual period, an excited attack preceded by about two days of increasing restlessness. At the crisis patient sings, swears, bangs about movables, threatens to take her own life and that of others. The acute attack lasts for a day or two and is followed by a period of depression and inactivity for a day or two, after which the patient's reactions return to a normal level.

On the whole this case is differentiated from that of the epileptic temper (to which it is most closely allied) by *threats* of personal injury, in place of actual assaults; by having a more regular interval and especially by being often associated with the menstrual period. In this class of cases the temper is particularly apt to occur in females though not confined to that sex; and when it occurs in males it is also sometimes periodic—monthly or fortnightly (families 61, 103).

Monkeys show this type of temper. Garner (1890, p. 162) tells of his female chimpanzee, Elisheba, that when her male companion was annoyed or vexed by anyone she never failed to take his part. "At such times she became frantic with rage, and if the cause was prolonged, she often for *hours afterwards refused to eat.*" Here we get the same depression following the excitation as is shown by the hysterical young woman.

If a name were desired for this class of cases it might be called the hysterical bad temper and its diagnostic features periodicity and an insight into conditions which prevents the patient from carrying out her worst threats. In the epileptic temper, there is

frequently no such insight, there is often a partial or complete loss of insight and control in which the patient carries out her impulses. The epileptic temper is much the more dangerous to society.

The manic temper has a wholly different periodicity. It is present, usually, during a long time, several weeks or even months. Insight may or may not be present; elation is a common feature.

(d) *General.*—I have spoken in the preceding paragraphs of the epileptic, the manic and the hysterical violent temper. Are these three types to be regarded as wholly distinct entities or as due to the same kind of determiner in the germ-plasm modified in its development and manifestation by the other conditions that lie at the base of epilepsy, mania, and hysteria? The best criterion for deciding this question lies in a study of the inheritance of the tendency, and to that subject we will directly attend.

In the foregoing brief acount of the different forms of violent temper shown by our patients little is said about the inciting cause. Each outburst has, it is true, its exciting cause, but the important point is that at particular times—more or less periodic— the very irritant that would ordinarily cause no response leads to a violent reaction. The irritant is no more the sufficient cause of the outburst than the pressing of an electric key that closes the circuit to a "mine" is the sufficient cause of the resulting explosion. The patients are different from other people (even their own brothers and sisters) in that, at more or less regular intervals, they react explosively to a wholly trivial circumstance.

C. *Method of Inheritance.* (a) *Heredity of Violent Temper in Hysterical Families* (Table IV).—We may first consider the inheritance of the last class of cases—the "hysterical" group of bad tempers ; because this is, perhaps, less complicated by the presence of violent neuroses—in fact, some of the cases seem to be nearly cases of pure "bad temper."

Before undertaking this analysis I may call attention to the fact that the data were collected by persons who did not have violent temper particularly in mind; the data came to be recorded because thrust upon them by the persons they interviewed. Therefore, the violent temper must have been, in every case, a striking trait of the personality. Also, it must often not have got into the records even when it existed ; partly to shield those near and dear, who have, perhaps, recently died ; partly because the facts are not recalled.

Of the 24 family histories there are only 3 in which the tendency to bad temper shows a break in any generation. These are: Case 91, in which the mother has long been dead; Case 4, in which the mother's traits are little known; and Case 66 where the mother's temper is not referred to at all. In the remaining 21 family histories there are 23 cases where at least one parent of an affected fraternity has a bad temper. There are seven fraternities in which at least one parent and one where that parent's parents show the same temper. There is only one clear case, or at most two (Cases 40 and 67), where *both* parents of an affected fraternity show the outbursts of bad temper. In the first case both children are affected; in the second case two out of five. This gives 4 affected out of 7, or 57 per cent., expectation being 75 per cent.

Now there are several possibilities concerning the inheritance of the liability to outbursts of temper in this class. It may be a "mono-hybrid" and then depend on the absence of a unit determiner or upon its presence. It may be a dihybrid or a greater multiple. It may be due to a complex of factors, or to the absence of some of them. If due to the absence of one of several factors influencing control of temper, then two "absences" in the parent might produce "presence" of the trait in the soma of all offspring. It might be sex-linked. Now our data, I think, suffice to enable us to decide definitely between all of these possibilities. The fact that the tendency usually (practically always in the fully studied cases) does not skip a generation indicates that it is *not* sex-linked and that it is a dominant. That it is not a simple absence of a monohybrid element is proved by the appearance of well controlled children in the progeny of two parents who show the outbreaks. If prevention of control of the temper were due to two factors, then in the offspring of two "heterozygous" parents only 1 in 16 should be without this preventer and thus only 1 in 16 should be able to control temper. As we have seen, 3 out of 7 are controlled and this is much nearer the 1 in 4 found in monohybrids than the 1 in 16 characteristic of dihybrids. It seems probable, consequently, that violent outbursts of temper—or tantrums—are due to a simple, single, positive determiner—a determiner that prevents the action of the inhibitor that normally keeps the emotions under control.

Since formulating this hypothesis numerous other family histories have come into my hands showing outbursts of temper of the hysterical type occurring for two and occasionally for three

consecutive generations; thus constantly the hypothesis is confirmed.

If the tendency to bad temper is a positive character, then matings of violent temper with controlled should yield in about half the fraternity the liability to outburst of temper or, occasionally, all the fraternity should be uncontrolled.

Of the fraternities of two or more described members that include no controlled persons we have four (Table V).

As these families are small no great stress can be laid on these matings which have yielded no controlled progeny.

Of the fraternities comprizing both controlled and uncontrolled and quite certainly having only one Tp[1] parent, we have the list given in Table VI.

Actually we get in 82 offspring 39 uncontrolled in temper. This is nearly the expected half. This supports, again, the hypothesis of the positive and monohybrid nature of violent temper.

B. Heredity of Violent Temper in Families with Epilepsy (Table II).—The whole subject of the relation of epilepsy and outburst of temper is a complex one. Bad temper, while common among epileptics, is not a necessary feature of their behavior. Indeed, the sudden violent temper that frequently introduces a convulsive attack appears (Binswanger, 1899, p. 188) most commonly with incomplete or small attacks. It would seem, then, that the emotional disturbance is not an essential part of the epilepsy in the sense that loss of consciousness is held to be; but that the same unfavorable conditions acting on a weak neural basis result in the loss of consciousness and, frequently, convulsions, and also may act on the inhibiting mechanism, resulting in outbursts of temper and other emotional storms. In epileptic convulsions the weak-nervous condition is the primary consideration; in emotional storms the hormones (if the suggestion may be hazarded) that paralyze inhibition are the chief factor.

In the 21 family histories in this class (Table II) there are 20 cases where of a fraternity having at least one representative with temper one parent is stated likewise to show bad temper, one additional case (Family 13) in which the record may properly be interpreted to indicate parental violent temper. There are 5 cases in which the presence of temper in either parent is not stated. There is one case of temper (Family 92) for 5 genera-

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[1] Here and elsewhere Tp is used as a convenient abbreviation for *violent, more or less periodic, outbursts of temper.*

tions without a break; 8 cases of temper for 3 generations in direct descent and numerous cases of two successive generations. With the negative cases are not included the earliest generation (except in one case). In almost every instance of failure there is lack of testimony of any sort about temper. These facts then demonstrate that there is a difference in heredity between the tendency to unconscious spells found in epilepsy (see Davenport and Weeks, 1911) and the anti-inhibiting factor of violent temper. Typical cases are given in Figs. 1, 2, 3 and 4 and their legends.

An examination of the five doubtful cases (Nos. 36, 50, 51, 70, 160) yields the following results.

36. The patient's sister has a vile temper. She is rearing her little brother; from time to time she flies into a *fit of passion* and beats him cruelly on the head until the child is nearly crazy. The traits of the father are unknown; he died 6 years ago; one of his sisters is said to be an epileptic, another has a son who is a dementia præcox. The father's mother is of a degenerate family. The mother is quiet and well behaved; she has an epiletic sister who never loses consciousness during her fits. The mother's father was eccentric, severe, hard to get on with. The mother's mother was a simple plain woman. It seems probable that the tendency to fits of passion is a trait derived from the paternal strain.

50. The patient is an awful fighter when drunk; since the removal of her ovaries she has caused little trouble. Her brother and his son have each a violent temper and two others of her sibs have been at times insane. Her father was a mechanical genius and a wanderer; but as he disappeared 2 years ago no data could be obtained about his temper. One of his sisters had epilepsy for 22 years and had an epileptic child. The patient's mother was smart, capable, witty; one of her brother's children had "delusional insanity." The reason why we are not able to trace back the origin of the violent temper of the patient and her brother is probably because of our ignorance about their father.

51. The patient, described on page 596, epileptic herself and with two epileptic brothers, has an alcoholic father of whose disposition there is no record. His sister has epileptic seizures before and after which she is very cross and disagreeable. Both of the paternal grandparents are feebleminded, one died quite demented. Of the disposition of the mother, who is a feebleminded epileptic, we have little knowledge; she is now too deteriorated

to give any reaction but bears the reputation of being very quiet and not liable to outbreaks of temper. It seems probable that the violent temper comes through the father's line.

70. The patient is described on page 596. Both she and her sister have convulsions. The father is a man of intelligence and education and of good habits; a statistician. The mother is inferior but is reported to have "gentle manners"; her eldest sister has epileptic fits and became insane at adolescence; the second sister was subject to *irritable spells;* and the youngest sister was feebleminded and epileptic. The mother's mother was alcoholic and became queer before her death; two other members of the family were mentally unbalanced and one was also a kleptomaniac. The history seems to offer a clear exception to the rule; but details are unfortunately lacking concerning the mother's disposition and it is apparently from her side that the daughter's tendencies come.

160. It is the patient's mother's fraternity that shows the violent temper (the patient herself has *fits of sullenness*). The mother herself has a "bad temper" and *at times* she becomes unmanageable. The mother's youngest brother has an *ungovernable temper,* though mentally he is one of the brightest in the fraternity. The mother's father died 47 years ago; there exists the tradition that he and his two brothers were "not all right" mentally. The mother's mother also died 30 odd years ago. We thus lack knowledge of the disposition of these grand-parents because they have been so long dead. This history forms properly no exception.

Thus of the five doubtful cases that of Family 70 is the only one that can be said to be negative and here, also, adequate details are lacking. We may, consequently, conclude that violent temper in families with epilepsy is also inherited as a dominant, or positive, trait.

To compare the number of uncontrolled with the total number of described progeny in fraternities containing both controlled and uncontrolled individuals Table VII has been drawn up.

From Table VII it appears that of 66 available offspring 30 are liable to violent temper. This gives nearly the half expected on the hypothesis of the positive and monohybrid nature of violent temper.

In certain fraternities (26a, 26b, 157, 42:98 and K. P. 55469) resulting from the uncontrolled $\times$ normal mating, all offspring

show controlled temper; but as there are only 7 of such individuals this result cannot be said to be very significant.

C. *Heredity of Bad Temper in Families with Insane Relatives* (Table III).—In this class we are, unfortunately, dealing with relatively small numbers and the consideration of these families is introduced for the sake of completeness. Here we have positive evidence of " direct heredity " in 21 families and no evidence of direct heredity in 4 cases. The doubtful cases are Nos. 117, K. P. 33067, K. P. 35943 and K. P. 55464. The facts so far as known about these exceptional cases are as follows.

117. Propositus (patient's mother) has an uncontrollable temper; when angry will pick up a knife to use on victim. Her eldest brother had a *high temper* and another brother went on *sprees* and on these occasions his *high temper was uncontrollable*. About the father it is known only that he drank and stole, as did also the father's father. The father's father's mother had *intermittent* attacks of insanity. Of the mother very little is known except that she drank whiskey and morphine and came from recognized bad stock. It is doubtful whether the violent temper of the central fraternity is derived from the maternal or the paternal side; adequate data are simply lacking on account of the remoteness of the generation.

K. P. 33067. Patient is described as R (page 598). The diagnosis of her case is manic-depressive insanity. She has had 3 insane brothers. Of her father we know only that he died insane, but nothing is known about her mother.

K. P. 35943. Patient is described as D (page 598). He is a manic-depressive. His father has undergone senile deterioration at the age of 79; he has an insane brother. The patient's mother is unknown.

K. P. 55464. Patient is described as T (page 598) and the diagnosis is manic-depressive insanity. The family history is extremely fragmentary (the rest of the family is described in 16 words).

Thus it appears that in all cases where data are given for one generation only of violent temper there is merely a lack of any (or, at the most, of sufficient) data about the ancestors of the propositus.

It is probable that the liability to emotional storms is, in some cases at least, distinct from the neuropathic constitution and that

the association of such violent outbursts of temper with mania is not a necessary one. Yet mania and bad temper have certain relations. Inhibitions are removed in both cases; in mania sometimes in both the intellectual and the emotional spheres. As Stransky (1911, p. 48) says: "The psychosis induces, as it were, the paradoxial effect of an increased mental capacity, since the psychomotor excitation and the emotional elevation set aside those inhibitions which otherwise oppose the conversion of inner excitations into external acts."

The actual facts in regard to family histories of bad tempers associated with insanity are given in Figures 5 and 6 and their associated legends.

To get the proportion of uncontrolled individuals to described individuals in fraternities derived from the matings of uncontrolled × uncontrolled Table VIII has been drawn up.

From Table VIII it appears that, of 83 offspring of uncontrolled × controlled matings available for study, 40 are liable to outburst of temper. This gives about the half expected on the hypothesis of the positive and monohybrid nature of the factor of violent temper.

D. *Conclusions drawn from the study of Inheritance.*—The best single rough criterion of a simple dominant trait is the reappearance of the trait in each generation in some of the children of an affected person. This criterion is most strikingly fulfilled by the trait that we are considering.

Family 92 (Fig. 1) is an especially noteworthy example for here, on account of the prominence and intellectual standing of the members of the family, the tendency to violent emotional disturbances has been recorded and can be traced without a break for five generations. In a fair proportion of the histories the family tendency can be traced for three consecutive generations.

It follows naturally that, since the tendency to violent temper does not skip generations, unaffected members of a fraternity, who select an emotionally controlled consort, will only exceptionally, if ever, have affected offspring.

To test segregation of the trait it is necessary to examine the ratio of affected offspring in any fraternity to the total number of offspring whose emotional history is fully described. From the mating of a simplex uncontrolled and a normal person expectation is that 50 per cent. of the children will be uncontrolled.

A summation of Tables VI, VII and VIII gives a total of 109 affected among 231 sufficiently described, or close to the 50 per cent. expected on the hypothesis that the tendency to outbursts of temper is a monohybrid positive trait.

The study of the data of inheritance considered in this paper leads to the following conclusions.

1. The tendency to outbursts of temper—" tantrums " in adults—whether more or less periodic or irregular and whether associated with epilepsy, hysteria, or mania, or not, is inherited as a positive (dominant) trait, typically does not skip a generation and tends, ordinarily, to reappear, on the average, in half of the children of an affected parent.

2. It would seem to follow from the data here presented that epilepsy, hysteria, and mania are not the causes of the violent tempers frequently accompanying them; the violent outbursts are in no clear sense the " equivalent " of these various psychoses. Rather the violent outbursts of temper are due, in all these associations, to a factor that causes periodic disturbance (possibly, paralysis of the inhibitory mechanism?). This factor has the greatest effect when acting on a nervous system that is especially liable to show the other psychoses. In other words, " tantrums " are apt to be associated with these various neurotic conditions while they have no necessary connection with them.

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TABLE I

Terms Used by Field Workers in Describing Temper, and the Number of Times Each is Used

Quick temper 50
Terribly quick temper 1
Violent temper 47
Very violent temper 4
Exceedingly violent temper 2
Ungovernable temper 13
Uncontrolled temper 10
Loss of temper 1
Bad temper 24
Very bad temper 5
Terrible temper 2
Hot temper 5
Vicious temper 2
Ugly, ferocious, fiery, each..... 1
Severe, sharp, harsh, strong, irri-
    table, uncertain, very hot
    temper, each 1
Violent, hasty temper 2
High temper 4
Fits of temper 9
Violent fits of temper 2
Terrible fits of temper 1

Violent temper, when drunk ... 5
Spells of temper 3
Outbreaks of temper 2
Outbursts of temper 2
Violent outbursts of temper 1
Outbursts of violent passion... 1
Rage spells 1
Tantrums 3
Violent tantrums 2
Anger 8
Violent anger 1
Furious anger 1
Easily started anger 1
Disposition: bad, 1; cruel, 2;
    ugly, 1; devilish, 1.
A few other scattered terms
    (quarrelsome, 5; irritable, sharp
    tongued, 2; irascible) were
    employed which give a less
    clear picture or have a doubt-
    ful significance for our study.

TABLE II

Showing the Distribution of Bad Temper in the Principal Fraternity when there are Epileptoid Convulsions in it or in Close Relatives, Ancestry, etc.

Family No.	Offspring Total	X	[Early]	Temper ♂	Temper ♀	No Temper ♂	No Temper ♀	F	FF	FM	Remarks	M	MF	MM	Remarks
11	4	0	0	1	1	1	1	Tp	:	Tp	F's sib's ch. E, Tp	N	N	Tp	M's sib Tp (fig. 2)
15	4	0	2	1	1	0	1	Tp[1]	x[2]	Tp		Lewd.	A	A, Sx	M's sib E. (fig. 3.)
18	1	0	1	0	1	1	1	Good natured	N[2]	Ne[3]		Tp	Tp?	Ne	
26	1	0	0	1	0	0	0	—	—	—		Tp	Tp	N	M's F, bro. E (fig. 4)
26a	3	0	0	1	2	0	0	Tp	—	—	F's sist. Tp; FB Tp; FB E; FFB E	Religious	N?	—	MFB E
26b	3	1	0	1	1	0	0	Tp	Tp	N		Sx	x	x	
20	3	0	0	1	1	0	2	Tp	—	—	F's sist. E; FB (F)	Sx. Scandal monger	Severe. Eccentric	x	M's sist. E or hyst.
36	10	2	0	3	1	3	4[5]	x	x	From degenerate family		Tp. E Witty			
42	1	0	0	0	1	0	0	Quiet x(w)	N	N	F's sist. E *has son. Tp	Moron	Tp	N	
50	6	2[6]	0	1*	2[6]	0	1	x(w)	x(w)	X	FMB, 3 sons I; FF sist. E	E	—	—	MB has 3 children with occasional I
50a	2	0	0	1	0	1	0	Tp	Tp	Demented			—	—	
51	10	87	1, E	0	1	0	0	E, A	E, A	—	FB, (F)	—	—	—	
53	4	0	0	2	0	0	2	Tp	x	—	F's sist. (F); FB (E)	—	—	—	

[1] F's 2 sibs Tp. [2] One niece, I. [3] Her grandfather, E. [4] One highly excitable, two suspicious. [5] I. [6] One I. [7] Two are E, and five are (F). F's sister E. * "One of two of this man's sons" has his father's temper.

TABLE II

Case No.	Offspring							F	Remarks	FF	FM	Ancestry			Remarks
	Total	×	†Early	Temper ♂	Temper ♀	No. Temper ♂	No. Temper ♀					M	MF	MM	
70	2	0	0	0	1, E	1. E	0	×		—	—	Gentle	A	A Queer	M's sist, E & I; M's sist, (F) & E; MM sist E
92	4	1	0	0	1	1	1	Tp	FFF Tp	Tp	N	Sx	Relig, I	×	MMB E; MMB E; M's sist I (fig. 1.)
92a	4	1, E	0	1	1	1, 1	0	Tp		Tp	N	N	—	Opium user	M's sist. E
119	9	1	0	0	2[3]	1	5[9]	Tp		—	—	F	F, A	—	MF sist. child I; MM sibs A
122	4	1[10]	0	0	1	0	2[11]	Jolly		Con-trolled	Jolly	Tp	W, sprees	—	MB, Tp; MFB, E; MFM, E; MF's sist. I
157	4	2, E	1	0	1[12]	0	0	E	F's sist's dau. Tp	A	×	Tp	Tp	0	M's sist. dau. tantrums. MB, Tp
160	0	1, E		1	1	0	5	Queer	FB, Tp	E	—	×	—	—	M's sist. "ugly" disposition
42:98	12	1		2	0	0	0	E?, Tp		E	×	× Ugly Tp	×	×	
42:103	11	5		3[13]	2[14]	2[14]	0	A		×	×		×	×	
42:81	3	0		2	0	0	1E	Tp	FB sui	×	×	Mild E? even-tempered Ne	demented	mind impaired	
K.P 55409	1	0		0	1	0	0	Tp	FB's son E	×	—		—	—	
41:120	12[15]	0		3	3	2	2	Tp[16]		N	Tp			—	
Totals	126	29	11	18	25	16	4	27							

[8] One (F).   [9] One (F).   [10] "Stubborn."   [11] One swears.   [12] Nine years, unstable and hard to manage.   [13] One E.   [14] One goes on sprees. one Ne.   [15] Three have convulsions.   [16] Of 8 sibs. one quick Tp, two irritable.

Abbreviations.—A, alcoholic; B, brother; bro, brother; ch, child; dau, daughter; E, epileptic; (F), feebleminded; F, father; F's, father's; I, insane; M, mother; N, normal in respect to temper; Ne, neurotic; psychoneurotic; sib, brother or sister; sist, sister; Sx, erotic; Tp, violent temper; W, nomadic; ×, no details; †, early, died young; ♂ male; ♀ female.—no description.

TABLE III

Showing the Distribution of Bad Temper in a Principal Fraternity where there is a Record of Mania in it or in the Close Relatives, Ancestry, etc.

Case No.	Total		+Early	Temper ♂	Temper ♀	No Temper ♂	No Temper ♀	F	FF	FM	Remarks	M	MF	MM	Remarks
					Offspring							Ancestry			
7	4	1	0	0	1	0	2	Sx A	Sen. dem.	Par. I	FF sibs. sui. melancholic	Passionate Queer, Tp	"Spells" of being rattled Nervous, excitable	—	MF sibs have Tp MFM sist. Md–I (Fig. 5)
21	4	0	0	0	2	1	1¹	Tp	Sx A	Tp	FFM (1), F's sist has tantrums FB, abused wife FB, taciturn	Ugly but now cowed	Sweet disposition	Sweet disposition	
54	1	0	0	0	1 1	0	0	When drunk unpleasant	—	—		Tp, when drunk violent as a beast	† Paralysis	† Paralysis	MFM (1) M's sist. (i)
57	9	5	0	2	0	2	0	Tp	—	—		Tp²		—	M's sib I (Fig. 6)
63	3	0	0	0	2	1	0	Tp	Tp	—		Weak character	—	—	
117	5	0	0	2³	2	0	1	Wild	A	X		Demon; drug fiend	"bad stock"		
117a	5	0	0	1⁴	2⁵	2	0	F. swears	sui even tempered	F	FFF, Tp	Tp	Wild	Tp	MB, hypochondriac MB, sui, Tp.
137	4	0	0	0	1,1	1	2	Tp	sui	even	FB Tp F's sist. I FM sis. Tp.	Flighty	N	1 (d. p.) Sui.	MB I M's sist. I MB Tp
146	2	0	0	0	1	0	1 Ne	Tp	even tempered	Tp		Tp	Good disposition	1	M's sist., 1 & Tp MF. I
140a	7	0	4	2	1,1¹⁶	0		even tempered	Jolly⁷	N	F's sist. I	Tp	—	—	
153	4	0	0	2	0	0	2⁸	F	—	—		Tp, I	Tp	Tp, I	
153a	11	0	0	0	3⁹	0	2¹⁰	Tp	—	—		Irascible I	—	Sui.	
154	3	0	0	0	1,1	2	0	I, A	Tp	Mild		Tp, I	Tp	1 Tp	
156	8	0	0	3	1	2	2	F	N	N		Tp, F	Tp, I	Tp	

¹ Excitable. ² Sister insane. ³ Hypochondriac. ⁴ Swears. ⁵ One swears. ⁶ Daughter, Tp. ⁷ Sister I. ⁸ One 1 and 1 (F). ⁹ One 1.
¹⁰ Two 1. ¹¹ One 1, 1 Ecc. ¹² One E. ¹³ Four are Ne. ¹⁴ One I. ¹⁵ One had spasms. ¹⁶ All 1. ¹⁷ One Ne.

TABLE III

Case No.	Offspring Total	×	† Early	Temper ♂	Temper ♀	No Temper ♂	No Temper ♀	Ancestry F	FF	FM	Remarks	M	MF	MM	Remarks
161	9	1	2	2	0	2	2[11]	Tp	—	x	1 ecc.	good natured	—	—	
21:591	11	0	1	3[12]	1	0	6[13]	Tp, I	Sx	Sx		Irritable	—	Irritable	M's sist. I
41:120	11	0	0	3[14]	2	4[15]	2	Tp	N	Tp		x	—	—	
K.P. 33067	4	3[16]	0	0	1	0	0	I	—	—	FB I	—	—	—	
K.P. 35943	1	0	0	1	0	0	0	Sen. deterioration	—	—		—	—	—	
K.P. 55464	3	0	0	1	0	0	2	N	N	† apoplexy		N	—	—	
K.P. 54826	1	0	0	0	1,1	0	0	Tp	—	good natured		N	—	Tp	
K.P. 57669	3	?	2	0	1,1	0	0	Tp	Tp			N	even tempered		
K.P. 57669a	4	0	0	1	1	2	0	Tp	—	—	one of F's sibs had fits	N	—	N	
K.P. 61790	3	0	several	0	1,1	2[17]	0	I, A	—	x	FB sui.	Tp, I	Tp	—	M's sist Tp.
K.P. 62405	4	0	?	0	1,1	2	1	Tp periodic A	—	—		—	placid	—	
Totals	125	10	15	23	27	23	26								

Abbreviations.—d.p., dementia praecox; ecc., eccentric; Md-I, manic depressive insanity; sen. dem., senile dementia; sui, suicide. For additional abbreviations see Table II.

TABLE IV

Showing the Distribution of Bad Temper in the Principal Fraternity where there is no Epilepsy or "Insanity" Recorded in the Close Relatives. Ancestry, etc.

Case No.	Offspring							F	FF	FM	Remarks	Ancestry			Remarks
	Total	X	†Early	Temper ♂	Temper ♀	No Temper ♂	No Temper ♀					M	MF	MM	
4	2	0	0	0	1	0	1	Disappeared Bad repute Tp	x	x		Sx, Ne [Tp?]	x	Tp	
9	3	1	1	0	1	0	0	Thief	Thief	Tp hysterical		Hysterical melancholic Tp	demented	F	MB stubborn (Fig. 7) M sib Tp
23	8	0	1	1	0	4	2	Abused wife and children Good	Good	—		Tp	Good character	—	
24	12	2 yg.	8	0	2	0	0	Good	—	—	F's sibs self controlled	Tp	x	—	
25	18	2 yg.	10	0	4	2	0	Tp	Sx A	Tp demented		F	Periodic sprees	Good repute	M's 2 sibs Tp M's F's sist Tp (Fig. 8)
27	5	0	0	0	1	4 weak	0	Sprees, Tp Wayward	Wayward	Tp	F has 4 sibs with Tp	Gentle	Quiet	Patient	(Fig. 9)
27a	6	1	0	1	3	0	1	Wayward Tp	A	A, Ne	F's 2 sibs Tp	Tp			
40	2	0	0	0	2	0	0	Tp			F has 3 sibs with Tp	Tp			
41	5	0	0	0	1	2	2	Tp	Tp	Fits, easy going		Fainting spells easy going	Quiet	melancholy	MF B's son E (Fig. 10)

1 Wayward but young.   2 Three years old.   3 Young.   4 One silly.

| Case No. | Offspring | | | | | | | Ancestry | | | | | | | |
	Total	X	†Early	Temper ♂	Temper ♀	No. Temper ♂	No. Temper ♀	F	FF	FM	Remarks	M	MF	MM	Remarks
45	3	0	0	2	1	0	0	Tp	—	Steals		Melancholic	—	—	
46	4	0	0	1	2	1[1]	0	Tp	W	N		N	—	—	
58	2	0	0	0	1	1	0	Sprees	—	—		Tp	—	—	
58a	3	0	0	0	1	2	0	N	—	—		Tp	—	—	
61	7	1[2]	0	1	3	2	0	N	A	—		Tp	—	Sx	
66	2	0	0	0	1	0	1	"Good repute"	Tp?	Quiet		F good-natured	"Good repute"	Sx	MM sist Tp.
67	7	2[3]	0	0	2	2	1	Ugly	—	N		Tp	—	—	
73	2	0	0	2	0	0	1	N	N	—		Tp	—	—	
76	8	1	0	4	1	1	0	N	—	N		Tp	—	—	
77	4	0	0	0	2	2	2	Tp	N	—	F's sist Tp	Tp	—	—	
86	8	0	0	3	1	2	2	Tp	Rough, miserly	Childish in old age	FF sist "not right"	N	x	depressed	MM's sist. E MF B sti.
90	14	0	1	2	4	4	3	Tp	Tp?	N	F's 2 B's Tp FMB Dipso-maniac	Hysterical Beats children	x	—	
91	1	0	0	0	1	0	0	F Tp?	x	Sx, A		Sx	Sx, thief	F, Sx	M sist's son dipsomaniac
95	7	1	0	1	1	2	2	N	—	—		Tp	x	—	
97	9	3	0	1	1	2	2	Sx	—	—		Tp	Tp	—	
103	8	5	0	0	1	0	2	N	—	—		Tp	—	—	
42:111	4	0	0	2	0	2[1]	0	Tp	—	—		x	—	—	(Fig. 11)
Totals	154	20	21	21	38	35	19								

For interpretation of abbreviations see bottom of Tables II and III.

Table V

List of Fraternities from One Uncontrolled Parent all of whose Members are Uncontrolled (in Table II)

	No. Available in Fraternity	No. Uncontrolled
Family 24	2	2
Family 40	2	2
Family 45	3	3
Family 73	2	2

Table VI

List of Fraternities from One Uncontrolled Parent Containing Controlled and Uncontrolled Individuals (in Table IV)

Family No.	No. Available in Fraternity	No. Uncontrolled	Family No.	No. Available in Fraternity	No. Uncontrolled
25	6	4	77	4	2
27	5	1	86	8	4
41	5	1	90	13	6
46	4	3	95	6	2
58	2	1	97	6	2
58a	3	1	103	3	1
61	6	4	42 : 111	4	2
76	7	5	Totals	82	39

Table VII

List of Fraternities with Mixed Progeny from Matings: Uncontrolled ✕ Controlled (in Table II)

Family No.	No. Available in Fraternity	No. Uncontrolled	Family No.	No. Available in Fraternity	No. Uncontrolled
11	4	2			
15	2	1	122	3	1
18	3	1	160	8	2
50	4	3	42:103	5	3
50a	2	1	42:81	3	2
53	4	2	41:120	12	6
70	2	1			
92	3	1			
92a	3	2			
110	8	2	Total	66	30

TABLE VIII

List of Fraternities from Matings: Uncontrolled $\times$ Controlled (in Table III)

Fam. No.	No. Available in Fraternity	No. Uncontrolled	Fam. No.	No. Available in Fraternity	No. Uncontrolled
7	3	1	21:591	10	4
63	3	2	41:120	11	5
117a	5	3	K.P. 33067	1	1
137	4	1	K.P. 35943	1	1
146a	3	3	K.P. 54826	1	1
153	4	2	K.P. 55464	3	1
153a	5	3	K.P. 57669	1	1
154	3	1	K.P. 57669a	4	2
156	8	4	K.P. 61790	3	1
161	6	2	K.P. 62405	4	1
			Total	83	40
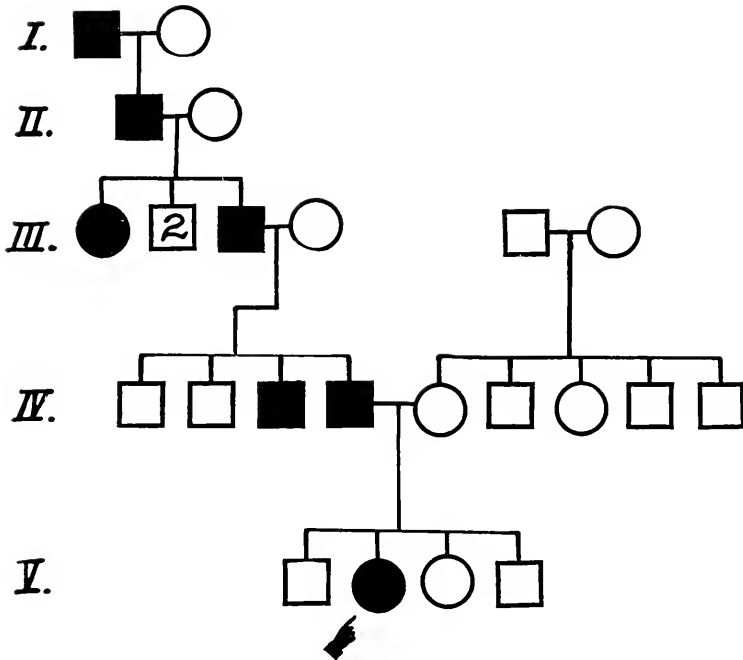
FIG. 1. Family 92. The patient (V 2) is a girl of 20 who had winning ways as a child, but was slow and lazy at school, and early began to run the streets. Placed by her father in a boarding house at the age of 12 she began an active sexual life. Is now lewd in thought, speech and action. She has *a violent temper quite uncontrolled. When angry she will throw anything she happens to have near at hand at the one who offended her.* Of late she has shown signs of insanity; *becomes angry and excited without cause.* She passed the Binet test very well. Her eldest brother is dissipated and nomadic; her sister is in high school but wild and probably Sx. Her younger brother at 12 years is very unmanageable; does average work at school.

The father as a child was hysterical and unmanageable. Sent to a technological school he divided his time between reading and women; is a tall, cultured man; *has a violent temper,* and will throw things around on the slightest provocation; is nearly blind from reading at night. One brother is a clergyman of high standing; another a man of excellent intellectual attainments, who has the reputation of being *quick tempered,* a professor in a State University. The father's father (III) is a man of high culture; was formerly professor of languages, and has a *violent temper;* his sister is a woman of brilliant intellect, eccentric, with a very *high temper so that she would get into a rage over nothing.*

The father's father's father was president of a leading Eastern university; he had *a quick temper* but had it under control. His father had *a quick, uneven temper.*

The father's father's mother and the father's mother were of the highest intelligence and entirely controlled. The mother of the patient is an attractive woman, but very erotic; her only sister, at 35 years, has been wild and immoral. She has been subject to fits of elation followed by deep depression; if crossed the least she would threaten suicide. One brother is of bad repute, but two other brothers are of good repute. Though there is much emotional instability on this side of the house, there is no record of violent temper.
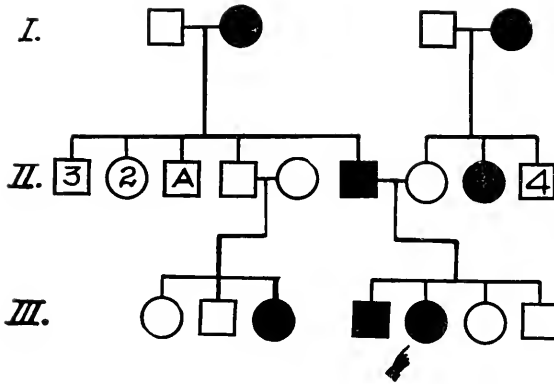
Fig. 2. Family 11. Patient, brought up under good influences, early showed signs of ungovernable temper; and in her school years her temper became worse until people began to think her insane. She began to frequent houses of ill-fame. Placed in a State school she was lazy and indolent. Would fly into a passion under least provocation; pounding, screaming, throwing things around and showing complete loss of control Placed at the farm house, in a passion she struck a girl with a chair; threatened suicide, tied a ribbon around her neck and attempted to choke herself. Her elder brother shows the same violent temper as the patient; the younger brother and the sister do not seem to be affected.

The father from three years on showed fits of temper in which he lost all control of himself; as he grew up, in fits of temper he threatened suicide. He has a brother who is briefly described as "an efficient man of excellent reputation" who married "a nervous woman of average intelligence." Of 4 children one is "an almost microcephalic idiot and epileptic, who rarely responds when addressed, and has a bad temper, throwing things at any one who offends her." This is one of the "exceptional" cases which it has not been possible to get further information on. In similar cases, a more detailed, subsequent study has revealed the fact that one or other of the parents had similar tendency to bad temper.

The father's mother was quick-tempered and impatient. Of the father's father little is known.

The mother is a woman of good repute, who had a good influence on her children as well as her husband. She had a sister who "would fly into violent fits of temper without cause"; considered by some to be insane. There were 4 brothers who were self-controlled.

The mother's mother was subject to outbreaks of violent passion without cause so that none of the family can live with her.

The mother's father was of good repute.
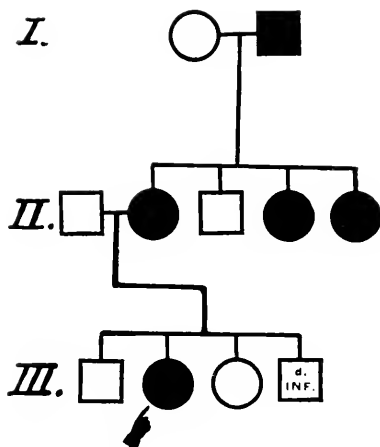
FIG. 3. Family 18. The patient, now aged 20, reared in poor environment, was erotic as a mere child. She is very emotional, gets angry without cause and shows violent temper. Her brother was mischief-loving as a boy and has now joined the army. Her sister is foolish and unambitious but apparently not subject to outbreaks.

The father is good-natured, irresponsible, untidy. The father's mother's father's father was an epileptic.

The mother early showed erotic tendencies, had a violent temper and was extravagant. Her brother wandered to the West. Her elder sister had a violent temper and so had the younger, who is always unmanageable.

The mother's father was wild, unmanageable and was known as "rowdy Dan" which is assumed to imply a bad temper. The mother's mother was a woman of bad character, a spiritualist and clairvoyant, who used to go into trances and give mediumistic seances.
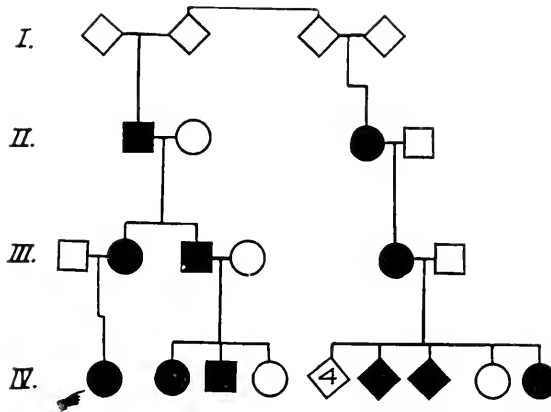
FIG. 4. Family 26. The patient, now 16, brought up under fair conditions, attended school regularly and did fairly good work with little effort up to the first year of the high school when she was asked to leave on account of her sexual offences. At home she showed *loss of temper* toward her imbecile aunt. At the Institution she has given no trouble except for occasional obstinacy.

The mother is troubled with sick headaches which last for several days; has an *exceedingly violent temper which she loses easily*, storms and swears. She has a brother who has *a violent temper* under the influence of which he throws things and will beat and kick his 15-year-old daughter. His eldest son when a mere baby would beat his head on the floor if not given his own way; he is obstinate, *quick tempered and profane when angry*. The daughter is very quick tempered and throws her little brother around when angry. She swears and is vulgar; is fond of boys and frequents questionable resorts.

The mother's father had a violent temper; would jump up from reading the Bible, *cursing and swearing;* was obstinate and disobedient from his youth up. One of his brothers was an epileptic; another brother has a periodic *violent temper;* a sister is *unable to control* her temper. (Not shown on chart.)

About the mother's father's parents we know nothing; but the mother's father has a first cousin (II 3) who has an exceedingly violent temper. Her daughter, likewise, has a very violent temper and is very religious. One day she got up from the table and went into her room and threw herself on her knees and prayed to be kept from losing her temper. She laughs very easily. Of her 8 children by a quiet man 3 have violent temper.

The mother's mother was religious but had little influence on her wayward daughter.

The father is unknown.
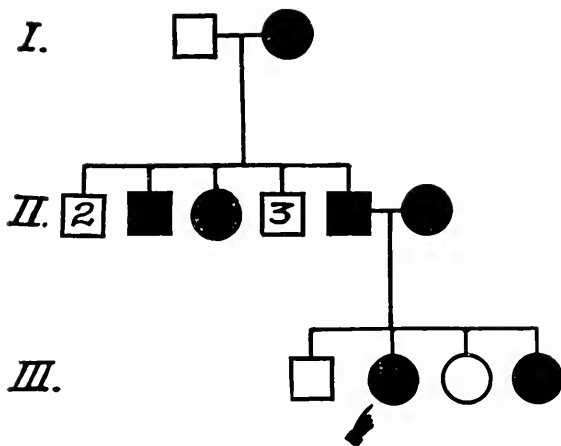
FIG. 5. Family 21. The patient, now 20 years old, early showed signs
of an ungovernable temper; after an attack she would sulk for hours and
could be aroused only with difficulty from brooding over real or fancied
wrongs. At 13 years, she began an active sexual life, was arrested for
arson, discharged for want of evidence of evil intent, got to drinking and
committed to state care. At the Institution she was, when aroused, most
tempestuous, at times almost raving; and used obscene language and oaths
freely. After three years of training she began to improve somewhat
but at a play given at the school she applauded loudly and finally became
hysterical. The next morning she complained of a general numbness and
later went into a state of stupor from which she could hardly be aroused.
Profound depression set in; expressions of endless guilt accompanied
by hallucinations of sight and hearing; transferred to a hospital for the
insane. Her younger sister is strikingly like her in looks, manner and
disposition. The brother is considered the best of the family. The elder
sister is very nervous and hysterical, and suffers much from severe
headaches.

The father was brought up under bad conditions; at 17, eloped with
and married a girl of 15. His temper became violent. He thought his
wife unfaithful and in his jealous rage he would tear and break things
and would keep the neighbors awake by noisy brawls or by burning
household things. It is reported that he spent one entire night cutting
the bedclothes into small pieces and burning them. He has a brother who
developed a religious mania and attempted at various times to kill his sister
and his brother. For the most part he is unobtrusive but the violent
attacks come on suddenly and he loses all control. A sister of the fore-
going goes into violent tantrums after which she is laid up for days
with sick headache. The other boys are dissolute but only one other
shows a moody disposition.

The father's mother was very erratic; had a violent temper and would
get excited over trivial affairs; one of her sisters was much like her.
Their father had a religious mania. (Not shown on chart.)

The father's father originally had marked mental ability but deterio-
rated; his father was a recluse.

The mother was always a wild, unmanageable girl with a disposition
so ugly that little could be done with her. She was quite incapable of
progressing at school. Her father was feebleminded and her mother was
of good mentality and disposition.
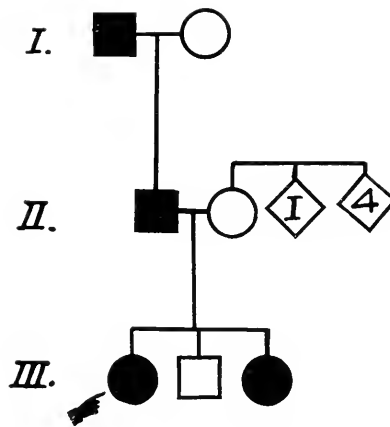
Fig. 6. Family 63. Patient reared somewhat irregularly, partly in an Industrial Home, partly by her mother, who lacked discipline. Her mother and brother tried to punish her but unsuccessfully. Patient *attacked her mother,* broke her glasses and hit her *brother on the head with a bicycle pump.* She was promiscuous with nearly grown boys. Her sister at 8 years is inclined to be stubborn and *has a quick temper.* Her brother works steadily and bears a good reputation.

The father was alcoholic and quick tempered. His father had a violent temper.

The mother is of good reputation but of weak character; one of her sibs was insane.
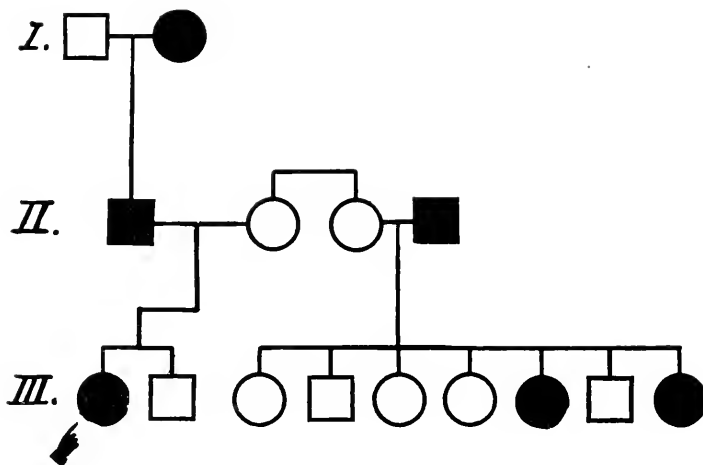
FIG. 7. Family 9. The patient, who from the age of 3 was cared for in a "Home," began to show erotic tendencies at 3 years. At 4 she had terrible fits of temper when she would scream for an hour at a time. At 13 she was placed in a State Institution. Here, if crossed, she (sometimes) becomes morbid, refuses to eat, threatens to kill herself, and gets into such a nervous condition as to suggest a manic-depressive condition; and during these fits she has taken creolin, ink and leaves sprayed with poison. Even now, at 18 years, she is of such nervous temperament that she loses control at the least inciting cause. Her only brother who has grown up is impertinent, disagreeable and untrustworthy but there is no record of outbursts of temper.

The father has always had an ungovernable temper. When intoxicated, he would often break up the furniture with an axe or put the family out of doors in any weather or conditions.

The father's mother has migraine and a very violent temper and is subject to hysterical attacks when she is almost insane. pulling out her hair and gnashing her teeth.

The father's father is a man of criminalistic tendencies, now hiding in the west.

The mother has had hysterical attacks without the violent temper. She would throw herself on the floor and scream for an hour at a time, and this attack would be followed by a deep melancholia when she would not talk to anybody. A brother is stubborn and he and his younger brothers are nomadic.

A sister of the mother married a man who was extremely erotic and had a fiendish temper allied to insanity. Of 7 children two girls have violent tempers; the first in her fit has to be restrained, and it is so explosive that her neighbors consider her insane. The second has "fits of temper" and suffers from headaches. The girls are first cousins of the patient.
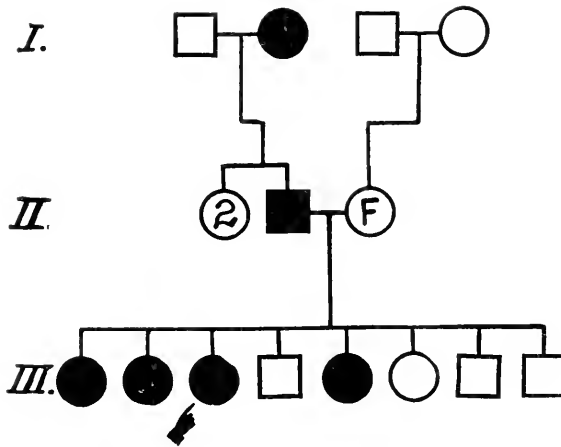
Fig. 8. Family 25. The patient was reared in a fairly comfortable home in a respectable neighborhood but of unintelligent parents. She early showed signs of immorality. At the Institution she is subject to attacks of ungovernable temper and loss of inhibitions, soon over. Her eldest sister who has an uncontrollable temper once hurled a lamp at her paramour. The second sister has a low mentality and a violent temper; will curse and swear on the slightest provocation. The next sister, at 13 years, shows excellent mentality and a very violent temper, is considered the brightest child in the parochial school.

The other sibs have better self-control. Ten others died early.

The father has such a violent temper that he often acts as though insane. He abuses his younger children by kicking them out of the house, striking their heads against the wall, etc. One of his sisters is a fine character; the other is immoral.

The father's mother is said to have had a violent temper, is now demented. The father's father drank and was very immoral.

The mother is mentally deficient but is kindly. Her father went on sprees but her mother was of good repute.
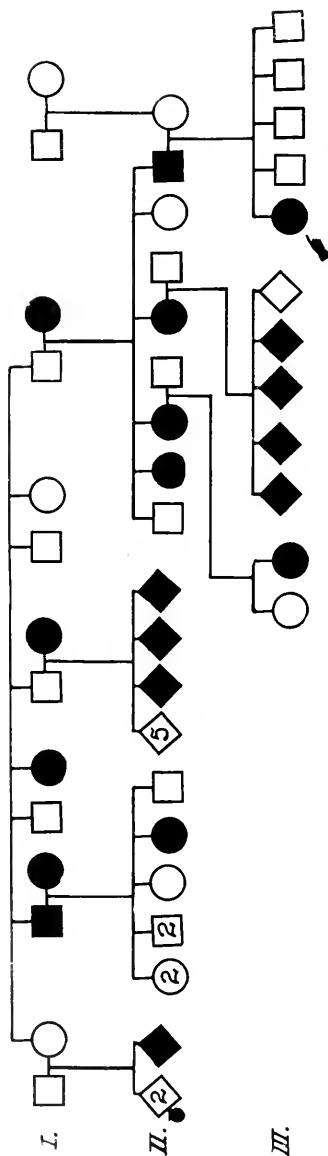
Fig. 9. Family 27. The patient, III 8, aged 21 years, early showed wilfulness and "quick temper." Placed in an institution her "outbursts of temper" gave trouble. She gets depressed, and longs for the fascination of the life of the demi-monde. None of her four brothers show her temper.

The father began early to go on sprees; when drunk he is so violent that he is like a madman and has often had to be locked up. One of his sisters is of a quiet disposition and so is probably one brother, but three sisters have a violent temper. Of one sister 4 of the 5 children have quick tempers and of another sister one of the two daughters has a bad temper.

Of the father's father not much is known. Two of his sibs had violent tempers; and two of them married women of violent tempers and had children with bad tempers. A sister (I, 2) of unascertained morals and temper has one child (one out of 3) who has a quick temper.

The patient's father's mother was quick-tempered.

The mother is gentle, over lenient, easily led and her parents were easy-going.
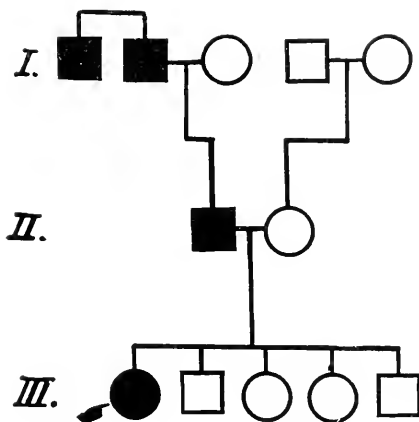
FIG. 10. Family 41. Patient, who is now 17, had all the comforts and luxuries of the average middle-class American home. She was quiet and refined in the house and a perfect tomboy out-of-doors. While always extremely suggestible, docile and obedient when reasoned with, a few minutes later she would emulate the worst child of the neighborhood in all sorts of naughtiness. In school, at 7th grade, considered above the average in ability. Began to steal and to show uncontrollable erotic tendencies. Placed in an Institution, on one occasion, following association with a suggestible comrade, she broke out with such violence that she was transferred to the cottage for incorrigibles. At the new house she went all lengths of penitence and resolved to do better; later she was sent to the State Reformatory. Her mother says of her temper: "She was like her father, lots." Her two brothers are obedient, studious and controlled. The elder sister is attractive, high-bred, spirited, but domestic in tastes. The younger sister had the same impulses as patient to be wild, reckless, disobedient; but she was always fairly well controlled.

The father, of respectable thrifty parents, has shown a tendency to rove, to steal and to drink. He is *uncertain in temper*, moody and talkative by spells. "You never know how he is going to take you." His temper is said to be " pretty fiery." His wife says he is a man who should never drink, because then his temper goes beyond all bounds. When he is perfectly free from alcohol, however, he has fits of temper, and sometimes they are just as bad as when he is drunk but his tantrums and sprees usually coincide. He has frequently broken up the furniture in the house and thrown it outside. His spells average two or three or more in a year. He has a brother moody like himself,—a periodic. Details of the temper of the father's three sisters are lacking. (Not shown on chart.)

The father's father also had a violent temper. "One day he was all right and the next day all wrong." All but one of his brothers had the family violent temper.

The father's mother "had fits." but, so far as known, no bad temper.

The mother is responsible, fairly industrious and ambitious. She is subject to fainting spells but otherwise has good health. She is even-tempered and apparently her family are all "even-tempered and easy-going." The mother's father is a shipmaster; one of his brothers has an epileptic son. The mother's mother is of clean, decent stock.

Not all of the individuals referred to are charted.
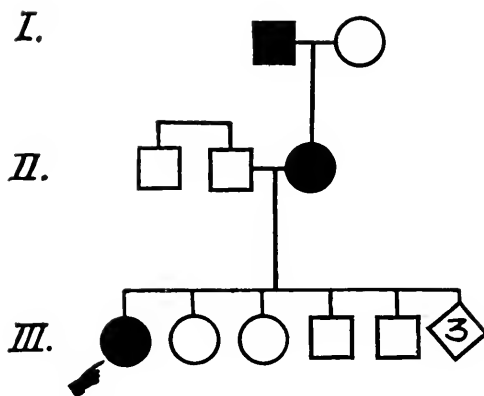
Fig. 11. Family 103. Patient was brought up under favorable conditions; in a good neighborhood, attractive home and congenial family life. She was always changeable in mood, sometimes good and sweet, again *cross and ugly, disagreeable and obstinate,* the contrasts were so sharp as to suggest a double personality. The ugly periods would generally come at the time of menstruation. They would be two or three days in gathering; then would come the crisis and it would take a day or two to calm over, with perhaps a little rebound before it was all over. A slight and unexpected cause would precipitate the crisis. Later she was immoral with boys, and was caught lying and stealing at home. At the Institution she continued to show her alternating periods. One day she was acting badly and the officer threatened to demote her. The crisis broke, " I want to go demoted. Send me demoted," etc. When in a crisis she will say: " You had better get away from me, I'm off." She does good work, during her quiet periods, in the eighth grade. Three of her sibs are in the west, unknown. The two sisters who are at home have a good reputation; the two brothers are troublesome and mischievous.

The father bears a good reputation and is quiet around home. His brother is a laborer who married a wayward woman and has 3 wayward sons, but none of this group has violent temper.

The mother is a woman of good reputation but with *a hasty temper* that does not last.

Of the mother's father it was said that his *disposition changed with the waxing and waning of the moon.* Sometimes, for days at a time, he would be cross and disagreeable; everything would make him angry. Then for days even the slightest thing would make him happy. The resemblance to him of his grandchild has been remarked upon.

Society Proceedings

AMERICAN NEUROLOGICAL ASSOCIATION

Forty-first Annual Meeting, Held in New York City, May 6, 7 and 8, 1915

The President, Dr. George W. Jacoby, in the Chair

The President's Address, "Exact and Inexact Methods in Neurology and Psychiatry," was delivered by Dr. Jacoby (*to be published in this Journal*).

POST NATAL GROWTH OF THE BRAIN UNDER SEVERAL EXPERIMENTAL CONDITIONS. STUDIES ON THE ALBINO RAT

By Henry H. Donaldson, Ph.D., S. Hatai, M.D., and H. D. King, M.D., of Philadelphia, Pa.

The general results of studies on the rat's brain are applicable to the human brain. Post natal increase in the weight of the brain is due almost entirely to the enlargement of cell elements already present at birth. The increase in brain weight between birth and maturity is, in the rat, about nine fold. This corresponds to a doubling on the average of the initial diameters of the cells. Increase in size is most evident in the cell bodies of the neurones—but the formation of the myelin contributes more than any other single process to the increase in weight. Under all experimental conditions the proportional weights of the divisions of the encephalon remain the same (except in the case of the bulbi olfactorii and flocculi). The conditions under which studies have been made are here grouped in accordance with their general effects on brain weight.

1. *Unfavorable Conditions.*—Domestication; some defective diets; disease (lung disease).

2. *Indifferent Conditions.*—Quantitative underfeeding with wholesome diets; some defective diets; inbreeding; gonadectomy.

3. *Favorable Conditions.*—Highly varied diets; exercise. Conclusions and applications.

Dr. Lewellys F. Barker, Baltimore, said he did not know whether the members of the Association realized how much detailed work had been done by Dr. Donaldson and his associates and was represented by this report. The results, given so briefly, are based on a series of weights and measurements in the animals experimented upon, contrasted with average

weights and measurements in animals under ordinary conditions established by a long series of observations. It had been Dr. Barker's good fortune to visit the Wistar Institute several times and to see the kind and amount of work that is going on there in connection with the remarkable colony of white rats which Dr. Donaldson and his associates have under their control. Dr. Barker had no conception before his visit of the large amount of detailed work which is being done. They are preparing a series of " reference tables" recording the weights and measurements of the body of the rat as a whole, and of its various parts so that when published we shall have a set of values for the white rat, comparable more or less to the tabular data used by insurance companies for the height and weight of human beings at different ages. While variability is, of course, an ear-mark of all biological data, still, a record of the data as determined for the strain of rats at the Wistar Institute, grown under usual conditions, should prove valuable as indicating what may be expected in general, though another strain may show a plus or a minus variation.

The results reported this morning are exceedingly interesting from the standpoint of growth. We must not, however, give to them any importance that they do not possess and Dr. Barker said he felt sure that Dr. Donaldson would want the members to realize actually what the importance of the research is. Thus when speaking of the influence of gonadectomy, it was pointed out that it had no effect upon the brain *as recorded in weights and measurements*. That is an exceedingly important point in itself, but we must not understand the result to mean that gonadectomy has no influence upon the *functions of the brain*. It does mean apparently that the weights and measurement of the brain are unaltered as a whole, or in the different parts tested, but everybody knows that gonadectomy is followed by exceedingly important changes in the functions of the brain.

Dr. Donaldson said he quite agreed with Dr. Barker in his remarks and should of course like to be judged by what he said rather than by what he did not say, in connection with these matters.

THE RELATION OF STRUCTURE AND FUNCTION IN THE NERVOUS SYSTEM (WITH DEMONSTRATION OF SPECIMENS)

By Stewart Paton, M.D., of Princeton, N. J.

1. Neurofibrillation as an index of the incidence of function.

2. The process of medullation, in contrast with neurofibrillation, is only remotely related to the functional activity of the nerves. Criticism of views of Flechsig school.

3. Histologic conditions which are indicative of the presence of reflex activity.

4. Possibilities existing for the correlation of structure and function in the nervous system.

Dr. James J. Putnam, of Boston, said he was deeply interested in Dr. Paton's observations, and more so that he had had an opportunity to talk over this subject with him a little and knew that Dr. Paton had been interested, as he himself had been, in the various vitalistic theories of growth and structure with reference to which Bergson has written so in-

telligently. Although it is true that structure does exercise an influence on function, it is important, Dr. Putnam thought, to recognize that, in general terms, the obverse relationship is still more significant. He presumed that Dr. Paton would not wish to assert that everything we know, learn and think, as human beings, and our love of justice, honor, and truth are really nothing but the expression of structure, defined, in its turn, as the expression of a chemical process, taken in the usual meaning of that term. In education, for example, where thought precedes effort and effort precedes the establishment of habits of new cerebral mechanism, it would seem that something which is properly definable as function antedates and causes structure, and it can hardly be doubted that the development of the nervous system has taken place on such lines as this, at least in part. How can we make efforts if these efforts are nothing but predetermined expressions of something which we call in a general way structural? Then Dr. Putnam wished to know how one determines that fact. We see in the first place a mass of protoplasmic substance and the heart gradually beginning to beat and finally the nervous system and nervous functions developing. Is there any way, except through inspection of our own processes and our own effort, in which we can determine whether or not the function or the structure had the precedence? What is the force which leads to the elaboration of the nervous system on these interesting lines, which makes it so well adapted for our purposes? Of course when we say that it is all the outcome of rhythmical chemical arrangements we do not assert any final cause. In that connection Dr. Putnam called attention to an interesting research carried on by Professor Henderson, of the Harvard Medical School, in regard to the preparedness of the structure of the earth, chemically and physically, for the organisms of a higher sort. Dr. Putnam said he could not give the exact details of the research, but that they showed in a very striking way that even the earth's crust existed apparently as the result of forces which foreshadowed the coming into existence of forms of life which had not as yet shown themselves. It seemed to him rather serious to conclude that we are really nothing but what Loeb long since made us out to be, namely, the outcome and the expression of chemical processes regarded in the ordinary sense. One conclusion or the other must be true. Either structure is more important than function as a cause of organized beings, or else function is more important than structure. From our own observation of ourselves, of our own thoughts and wills, we have a right to conclude that function usually precedes structure.

Dr. Sidney I. Schwab, of St. Louis, said he would like to ask Dr. Paton how he can compare the methods of observation he employs for determining structure with the cruder method of determining observations on the nervous system. May there not be in that an explanation of the difference in time of development?

Dr. Philip Coombs Knapp, of Boston, said he thought Dr. Putnam's criticism of Dr. Paton's conclusions was really another manifestation of the eternal contest between the doctrines of freedom of the will and necessity. The scientific standpoint, of course, has been for a long time that there was a pretty absolute determinism in the functions of the human brain. That is a doctrine which is antagonistic to many minds and which has been contested from the earliest days to the present time. One simple illustration that structure must necessarily precede function can be brought out from this fact. We are conscious of our functions. We are

by no means conscious of the structure. The absolute necessity of the
structure preceding function is shown by the fact that unless we have a
proper visual apparatus we remain blind and never can see. But Dr.
Knapp thought that anyone who had experience in teaching ought fully
to realize that it is not the vague transcendental desire to know which
accomplishes the acquisition of knowledge, but rather the ability of the
student to grasp the idea and to develop his knowledge. Experience in
teaching shows that, in spite of the best-developed schemes of instruc-
tion, in spite of every desire on the part of the pupil to learn, in spite of
every effort of the teacher, a certain percentage of the pupils, by reason
probably of a defect of structure, are going to remain hopelessly stupid
against which the teacher comes to regard himself, like the gods, as
powerless.

Dr. Paton, in closing, said that he had tried to be brief and that in
doing so one always runs the danger of becoming dogmatic. He certainly
did not intend to bring up the question of education here. He had
guinea-pigs in mind and so far as guinea-pigs are concerned his state-
ments were true. He hoped his hearers would not take what he had said
dogmatically as applied to the human being and that they would think
of him only as an enthusiast in regard to the guinea-pig. He had hoped
that somebody would be induced to take up investigating these early re-
actions in relation to the secretion of the glands which he had indicated.
It might be possible to show that definite changes could be brought about
in the nervous system by excess of secretion of the thyroid or the thymus.

VENTRICULAR HEMORRHAGE

By Alfred Gordon, M.D., of Philadelphia, Pa.

Twelve cases with hemorrhage in the lateral ventricles have been ob-
served by the author. The onset of the condition, the course and the
character of termination were strikingly identical in the entire series.
Duration of the comatose state. Suggestions as to management of such
cases.

Dr. Philip Coombs Knapp, of Boston, said he had seen a number of
cases of intraventricular hemorrhage, most of them, however, of the sec-
ondary variety. He could hardly agree with the symptomatology Dr.
Gordon had given. The ordinary symptomatology of the case differed
very little from that of an ordinary case of hemorrhage, excepting that
the coma has been a little more sudden in onset, perhaps, and distinctly
more profound. In practically every case there have been distinct signs
of hemiplegia, as we ordinarily detect them in a person who is comatose.
The one striking feature, however, in all the cases of ventricular hemor-
rhage Dr. Knapp had seen had been a distinct rigidity on both sides, not a
contracture, attended with various twitchings. In no case has there been
generalized convulsions. The twitchings have been irregular, not of the
clonic variety. In a number of cases confirmed by autopsy he has felt
that the rigidity and twitching of the limbs were so characteristic as to
warrant the diagnosis of intraventricular hemorrhage. In no case has he
seen generalized convulsions and in every case the signs of hemiplegia
have been very distinctly marked.

Dr. Alfred Reginald Allen, Philadelphia, said that at Dr. Spiller's in-

stance a number of years ago he studied the cases of ventricular hemorrhage in his laboratory, with particular reference to rigidity and twitching. He was unable to find there was any relation between rigidity and twitching and ventricular hemorrhage.

Dr. E. Sachs, St. Louis, said that the possibility of approaching these cases from the surgical standpoint must be kept in mind. It is essential to try to recognize them and if they are recognized it seemed to him that it was misdirected effort to do anything but try to attack the hemorrhage itself. To try merely to relieve pressure without trying to remove the extensive hemorrhage whch is present seemed to him unwise. He said he had not heard Dr. Gordon mention one symptom which had been described as rather characteristic of ventricular hemorrhage and that was excessive temperature. He was rather hopeful when he saw the title of Dr. Gordon's paper on the program that he would take up that question. He had been rather interested in that point from the physiological standpoint. It had been claimed by a number of experimental physiologists that the hyperthemia that one encounters in a variety of conditions is due to irritation of the fine fibres that lie along the floor of the ventricle. From the experimental standpoint he had never been able to substantiate that and he is rather anxious to hear whether those cases that were pure ventricular hemorrhages showed that symptom.

Dr. H. H. Hoppe, Cincinnati, said that in the diagnosis of intraventricular hemorrhage, namely in cases he had seen, there is a distinct interval between the onset of the hemorrhage and the development of coma. In one case there was a lapse of time between the onset of the attack, which occurred in an individual falling from a horse after his admission to the hospital, of possibly an hour and a half, during which there was a gradual loss of consciousness and in the course of two hours the coma deepened and continued until death.

Dr. Hugh T. Patrick, Chicago, said he would like to know if in any of these cases Dr. Gordon had the opportunity of comparing the blood pressure before and after the hemorrhage. Also, what were the further results of Marie's experience with decomprssion on the sound side, as probably Dr. Gordon had followed Marie's work.

Dr. J. Ramsey Hunt, New York, said he would like to ask Dr. Gordon if the optic nerves were examined and also as to the respiratory rhythm. Williamson has called attention to the occasional occurrence of optic neuritis in apoplexy and it would be particularly likely to accompany ventricular hemorrhage; also whether Cheyne-Stokes breathing was present. It was a prominent symptom in a case which Dr. Hunt saw, and had occurred very early, indeed almost immediately after the hemorrhage.

Dr. Alfred Gordon, in closing, said in reply to Dr. Knapp's remarks with reference to hemorrhage, he asked him whether his observations were primary or secondary. The reply was that Dr. Knapp saw only secondary hemorrhages. Consequently his remarks have no bearing on this subject discussed by Dr. Gordon because the latter spoke particularly of primary hemorrhage, a hemorrhage that occurred directly and primarily in the ventricle itself; with regard to contractures it is true the time is too short for development of contractures as some persons lived only 24 days, but others lived many days. Dr. Gordon had been very anxious to hear the experience of the members in reference to the state of the reflexes. The five cases of hemorrhage in the lateral ventricles alone were all uniformly accompanied by a mild paralysis, but without toe phenomenon and with-

out marked patellar reflex on the paralyzed side. In reference to the question of temperature: he was familiar more or less with the problem of investigation concerning temperature in such cases. From his present study he could not say anything special on the subject of temperature as a diagnostic guide to distinguish primary from secondary hemorrhage. The primary has at first no rise of temperature. In the secondary ventricular hemorrhage when coma developed, a rise of temperature actually occurred. The profound coma which Dr. Hoppe mentioned was one of the most striking symptoms from the beginning. It was profound throughout the short duration of life of the patient. In reference to blood pressure: it was taken in every one of the cases, but not knowing the patient's former blood pressure Dr. Gordon did not know whether there was any difference before and after the hemorrhage occurred. As to Marie's views, the patient operated upon had the operation done long before Marie's work was published. Out of reverence for that great man Dr. Gordon did not care to emphasize that particular point. Marie published a number of cases with illustrations, five or six cases, which he had operated on and the results seemed very encouraging. Dr. Gordon said he had only one case which was operated on and the remarkable amelioration of the condition which followed was certainly very encouraging. As to the optic nerve every one of the cases was examined and in none were there changes in the optic nerves. Perhaps it was because only the lateral ventricles were involved. As to the Cheyne-Stokes respiration he observed it at the very end of life, but equally in the secondary as in the primary ventricular hemorrhages.

THE REPORT OF TWO CASES OF EPILEPSY WITH UNUSUAL VASCULAR FINDINGS

By Ernest Sachs, M.D., of St. Louis, Mo.

Brief history of the two cases in one of which the focal epilepsy was produced by unusual growth of veins lying in the pia mater. Second case, large growth of veins lying in the dura and connecting with the cortex underneath.

Dr. M. Allen Starr, New York, thought the distinction Dr. Sachs had made was an exceedingly important one and should be adopted by all means. He erroneously, as he now sees, reported a case, quite similar to the second case Dr. Sachs showed, some years ago as an angioma. Dr. Starr said he admitted freely that that was a wrong classification and this was a case of telangiectasis. The case was an interesting one clinically and as it came to operation and Dr. McCosh tied off these vessels it might interest the Society. The patient was a boy of 17 who was brought to Dr. Starr from Charleston, S. C., to the Presbyterian Hospital because he was suffering from very peculiar attacks. These attacks had occurred for a year. They had begun at the age of fifteen. They were characterized by a sudden severe, intense pain in the parietal region on the left side. The pain was located by the boy over an area the size of a half dollar. The attack would begin gradually and for three days he was in the most intense agony and the agony was so great that by the end of the second day he was in a state of acute mania. He was entirely uncontrollable, fighting everyone who came near him, and these attacks of mania had been

increasing up to the time he was brought to New York. He suffered from these attacks at two weeks' intervals. No diagnosis had been made, there were no localizing signs. Between the attacks he was entirely normal in every way. There was no choked disk and the condition was quite a mysterious one. The attacks appeared to resemble in a way attacks of cortical epilepsy, although there was absolutely no spasm. There was an area of tenderness over the skull where he felt pain, which remained between the attacks. He was watched for two weeks and the second day he was wildly maniacal, entirely uncontrollable, had to be strapped down in bed and Dr. McCosh decided it was worth while to make an exploratory trephining operation. He trephined over this region of tenderness and the dura was apparently normal, but cutting through the dura he came down to one of these conditions of telangiectasis. There was a mass of veins on the surface and they resembled more a mass of angleworms than anything they could think of. That mass was tied off by ligating the veins communicating with the pia mater. The boy made a prompt recovery. He had for three days a condition of complete astereognosis with ataxia of the right hand which after three days passed away. The boy recovered. Dr. Starr heard from him two and three years after the operation and he had been perfectly well up to that time.

Dr. Alfred Gordon stated that in the Proceedings of the Neurological Society of Philadelphia published in THE JOURNAL OF NERVOUS AND MENTAL DISEASE several years ago, there will be found a description of a case almost identical with that of Dr. Sachs. It was that of a young man of thirty, who for fourteen years, if not more, had attacks of convulsions in the right leg alone. Never in the arm. The attacks were occasionally accompanied by loss of consciousness, but most of the time the consciousness was preserved. The patient could give a good description of the condition. Dr. Gordon examined him a number of times. The man was treated by internal medication for a number of years. The examination was practically negative except that the knee jerk on the right side was slightly increased. After observing him for a little while and finding everything negative, Dr. Gordon proposed an operation to him. Dr. Da-Costa opened his skull on the opposite side in the region corresponding to the leg center, and he found a square shaped area, surrounded by four veins, exceedingly large, one was as large as a little finger, and the others smaller. He ligated the veins, the patient made a good surgical recovery. He developed a mild astereognosis in the right arm and the convulsions ceased for a while. About six weeks later the convulsions returned, but this time with loss of consciousness exclusively. The patient returned to New York and later came to see Dr. Gordon again and he told him that the attacks occurred on exceedingly rare occasions. The condition was exactly like the one described by Dr. Sachs. It was a dilatation of the veins in the center corresponding to the leg.

Dr. E. B. Angell, of Rochester, N. Y., said he wished to add to this group of interesting cases another which has not yet been reported. He had a case of Jacksonian epilepsy develop in a youth of sixteen or seventeen, whose seizures dated back two or three years. They were not congenital. The attacks were so characteristic that it was easy to locate the cortical lesion. He was operated on by Dr. Zimmer, of Rochester, very successfully. In this case a condition was found similar to that described by those who preceded him, corresponding very closely to the case stated by Dr. Starr, the veins resembling a clump of angle worms. Dr. Angell

said that he considered it an angioma, according to the descriptions in the books. It had not the characteristics of a tumor and he was very glad that Dr. Sachs had given the more satisfactory name for this condition. The youth recovered absolutely. The surgeon tied off the veins and removed the mass. The operation was performed fifteen years ago, and for ten years to his knowledge there had been no convulsion. He has not heard from him since that time. He does not believe there is any more satisfactory occasion for operative interference than this condition affords.

Dr. J. Ramsey Hunt, New York, said that since Cushing's paper on trigeminal nævi and their intracranial complications a few years ago he has been on the lookout for such cases. He recalled three cases. One was an old infantile cerebral palsy with hemiplegia and epilepsy associated with large nævus in the trigeminal distribution. The other case was that of a man who had a trigeminal nævus and who in his fiftieth year developed epilepsy. The epilepsy, however, was not of the Jacksonian type. It was interesting, however, that always before the attack of epilepsy, there was a period, sometimes several hours, of severe pain directly beneath the trigeminal nævus, so there may have been in this case a connection between the epilepsy, which was general and appeared in his fiftieth year and the vascular lesions of the dura. One man Dr. Hunt saw had a congenital bunch of veins just above the root of the nose and all through his life had been subject to periodical headaches somewhat suggesting migraine. He states that before these headaches these veins always became swollen. Of course the relationship between the veins and the headaches is obscure, but Dr. Hunt thought it was always well to bear in mind the possibility of intracranial complications in these cases of trigeminal nævi, and other vascular tumors and malformation of the head.

Dr. H. H. Hoppe said in connection with the two cases published by Dr. Sachs there may be a similar condition of dilatation of the veins of the diploë. In Dr. Hoppe's case the boy was struck by a brick in the left occipital region. Years later distinctly Jacksonian attacks developed, occurring in the right arm. In some respects it was similar to the case of Dr. Starr. The convulsion seizures were usually followed by maniacal attacks lasting for twenty-four to thirty-six hours. Operation showed that a dilated vein from the diploë had perforated the inner table of the skull, forming a small round cyst-like projection, no larger than a pea which in turn had perforated the dura mater. There was a surrounding thickening of the dura. After a year the epileptic seizures returned. The man died fourteen or fifteen months after operation in status epilepticus. It is possible that there may have been the same dilatation of the veins of the diploë, corresponding to the condition described in Dr. Sachs's paper. No autopsy was obtained in Dr. Hoppe's case.

Dr. E. Sachs, in closing, said he did not wish to convey the idea that this was a very unusual condition. From the numerous cases that the members cited it is perfectly obvious he had not made a complete search of the literature and it is obvious that some of the cases reported in society proceedings would be missed. Dr. Sachs said he thought it was important in these cases to differentiate those cases which may have an inflammatory basis or in which the symptoms of Jacksonian epilepsy may be ascribed to some other condition. For instance in the case of hemiparesis that Dr. Hunt mentioned, possibly the nævus was merely an accidental finding and not responsible for the condition. In the same way in Dr. Hoppe's case the fact that there was a thickened dura suggested to him very strongly

that the case was primarily an inflammatory one. Those, of course, are entirely distinct conditions. A feature of the question that Dr. Sachs had not gone into, because it would be merely speculative, is the possibility of some light being thrown on the fundamental cause of epilepsy. In his opening remarks Dr. Sachs said that operations for Jacksonian epilepsy frequently have negative findings. It may be merely that we cannot recognize the pathological process as yet.

(To be continued).

THE PHILADELPHIA NEUROLOGICAL SOCIETY

February 26, 1915

The President, Dr. S. D. W. Ludlum, in the Chair

A CASE OF APHASIA

By Alfred Gordon, M.D.

Man, tailor by occupation, 41 years old, in the midst of apparently good health, excepting some headache a few days previously, two years ago upon getting up in the morning was suddenly seized with a violent convulsion confined to the right side of the body. He was unconscious. The attack lasted five minutes. Upon regaining consciousness he found himself hemiplegic on the entire right side and aphasic. For the six subsequent weeks he was confined to bed. From that time until the present the condition had remained unaltered.

The examination shows: Total right hemiplegia with motor aphasia. The general hearing and word-hearing, word-reading and sight in general are all well preserved. The intelligence is absolutely intact. The patient is able to comprehend all words spoken and carries out all commands perfectly. He is alert and wide-awake to all that is going on around him. The expression of his face reveals good intelligence. At no time since the onset of the condition was the intelligence in any manner involved, excepting the habitual mental hebetude observed immediately after the convulsive seizure. It is therefore evident that the classical sensory aphasia was not present in this case. His speech disorder consists of a total inability to pronounce words, to articulate and even to repeat syllables.

When we consider Marie's claim that mental deficit is present in all cases of true aphasia and that the latter is due to that deficit, viz., that the patient cannot speak because of a defect in language comprehension, in comprehension of the meaning of words, we must admit that the present case speaks against Marie's conception of aphasia. Neither can be here admitted Liepmann's view according to which defect of intelligence in motor aphasia means inability to understand the meaning of words, and in the sensory aphasia inability to understand the sounds of the words. The patient understands the significance of the words spoken or read and understands fully the sound of words. The case shows clearly the distinct separation of sensory and motor aphasias in accordance with the old classical views. The history of the convulsive attack and the accompany-

ing right hemiplegia places the lesion in the middle cerebral artery interfering with the function of the ascending frontal convolution, including the posterior end of Broca's area. At the meeting of the symposium on aphasia before the Philadelphia Neurological Society during the discussion Dr. Gordon presented the histories of three cases with autopsies showing a tumor in the frontal lobe in one instance and extensive softening in the basal ganglia in two instances. In these three cases there were evidences in favor of the old Broca's view on aphasia and against it, also in favor of Marie's localization of aphasia and against it. The present case, although only clinical, nevertheless is clear enough to militate against at least one phase of Marie's ideas, and pleads for the maintenance of the classical subdivision of aphasia, viz., into motor and sensory.

The patient's blood serum and cerebro-spinal fluid gave a positive Wassermann reaction on repeated examination. The eye examination was negative. His heart was normal.

Dr. Fred D. Weidman presented a specimen of ruptured aneurism of the left vertebral artery.

Dr. C. W. Burr presented a brain showing a tumor of the cerebellum.

Dr. J. Hendrie Lloyd said he had had the opportunity of seeing this man at the bedside. He had also been present at the operation, and he had had an opportunity a number of times of looking at the brain. The thing that was most striking at the bedside was the forced movement, or movement of deviation to one side. The patient tended to go over to his right side. In fact this was pretty nearly all that could satisfactorily be observed, except the blindness. The man's mental condition was such that it was not easy to get much else out of him. The tests now recommended for cerebellar lesions were not practicable in this case. Dr. Lloyd had seen these forced movements in quite a number of cases of cerebellar tumor, and in those cases the forced movement, or movement of lateral deviation, has been away from the side of the lesion. In the present case the tumor has not been dissected, but he thought from a gross examination that it involved the middle cerebellar peduncle. He thought at the bedside that this patient had a subtentorial lesion. He said that these forced movements, or movements of lateral deviation, in neoplasms in the cerebellum, involving the middle cerebellar peduncle, are usually away from the side of the lesion. There are a number of rules laid down by some writers for diagnosing these lesions. He said he could never recollect these rules rightly, and he thought they were mostly artificial. The important thing to recollect, according to his observation, was that the movement, as a rule, was away from the side of the lesion. Whether this was because the middle cerebellar peduncle was involved, he could not say. In fact, these tumors generally were so large, relative to the whole size of the cerebellum, that they must do much more than merely press upon such a limited area as the middle peduncle. Whether the movement is, or is not, called " forced," is a matter of secondary importance. It is a very conspicuous symptom. In the present case, when Dr. Lloyd examined the patient, the latter almost fell off the side of the bed because of this movement.

Dr. H. Maxwell Langdon said as he understood the case, while the man still had a high papilledema he lost his vision. It was possible as someone had suggested, that he might have had an atrophy and then with the pressure increasing recurrence of his papilledema, but as Dr. Langdon understood the case the man's vision disappeared very rapidly. The papil-

ledema must have been of short duration to have atrophy and then recurrence of swelling of the disk, or, as would seem more probable, vision had been lost during the stage of papilledema. Dr. Langdon thought growths in cerebellar and postcerebral regions are more likely to cause this than growths in other locations. He thought the cause was some disturbance in the cortex itself, possibly an edema or direct pressure of the growth.

Dr. Dercum stated that many years ago he had pointed out that an optic neuritis, intense in degree, rapid in evolution and attended by early loss of vision indicated, other things equal, cerebellar disease. Whatever the explanation may be the clinical fact remains.

Dr. Weisenburg said he did not like to disagree with Dr. Langdon, but he could not agree with the statement that the cause of the rapid loss of vision in tumors in the cerebellar fossa was because of the pressure exerted by such lesions on the occipital cortex. In the case under discussion the pons was very much pressed upon and the probabilities were that the flow of the cerebro-spinal fluid was interrupted because of the pressure on the aqueduct of Sylvius.

Dr. Langdon asked if in cerebellar growths the aqueduct be involved why do you not have more frequently complete loss of sight. Loss of vision during the stage of papilledema is unusual and worthy of mention.

Dr. B. Alexander Randall said that in some of the cerebellar growths we have an eyeground typical of albuminuric retinitis, as reported by W. F. Norris in his Mütter Lecture. It is worthy of note that we might have great deterioration or destruction of vision by these lesions which as generally seen by the ophthalmologist, would seem to indicate renal lesions which were merely complications of the intracranial neoplasm.

Dr. William G. Spiller said he doubted that every case of cerebello-pontine tumor produced hydrocephalus, and he did not believe Dr. Weisenburg held this view. Dr. Spiller had many specimens of such tumors in his laboratory. He had seen internal hydrocephalus produced by growths in this region, but he did not believe it was the invariable rule.

Dr. Weisenburg said that he did not mean to make the statement that there was a hydrocephalus in every case of cerebellar or cerebello-pontine tumor. He did want, however, to emphasize the fact that in cases such as that of Dr. Burr in which there was a cerebello-pontine tumor and in which there were pressure and distortion of the pons and the aqueduct of Sylvius, there must be an interference with the flow of the cerebro-spinal fluid and in this manner choked disc is produced.

Dr. Burr said that he did not agree with Dr. Lloyd as to the presence of forced movements in his patient. At no time when he saw him did he have any forced movements.

THE DISTRIBUTION OF TABETIC CRISIS WITH THE EXHIBITION OF AN UNUSUAL CASE.

By T. H. Weisenburg, M.D., and Philip Work, M.D.

In the study of a large number of tabetics the speakers had been impressed by the comparatively large number of patients in whom tabetic crisis had been mistaken for some abdominal surgical condition for which exploratory operations had been performed. This led them to study all the cases at their disposal in the wards of the Philadelphia Hospital and

in private practice, their purpose being to find out in how many instances such mistakes are made, and also the distribution of the crises in the different viscera. This statistical study has not as yet been completed, but they were taking this opportunity to present a very unusual case which illustrates the purpose of this discussion.

This patient, a man of about 25, was referred to one of them by Dr. J. M. Anders. He denied syphilis, and had never been treated for this disease. Two years before he came under observations he began to complain of nausea and vomiting, this lasting for nine days. Since then he has had repeated attacks coming on sometimes every week and again less frequently. Each time he had complained of vomiting and nausea and extreme prostration. One year after the beginning of the attacks an exploratory abdominal operation was performed and a healthy appendix removed. Nothing was found.

While in the Medico-Chirurgical Hospital under the care of Dr. Anders repeated gastric and X-ray examinations did not denote anything, but a neurological examination demonstrated irregular pupils with only a slight diminution to light, normal reflexes, no history of pains but a hypesthesia for touch and pain in the distribution of the fourth, fifth, sixth and seventh thoracic roots on both sides. A serum Wassermann demonstrated positive XXXX Wassermann and a study of the cerebrospinal fluid showed a normal cell count but a positive Wassermann, an unusual finding. It is apparent from this that the patient had a limited syphilitic irritation of the roots mentioned, and that this caused the gastric phenomena because as it is well known these roots transmit the sympathetic nerves of the stomach.

The interesting point of the case presented was the limitation of the syphilitic disease, in as much as the only symptoms that the patient had caused an implication of the 4th, 5th, 6th, 7th and probably the 8th thoracic roots, causing a hypesthesia in their distribution and nausea and vomiting; besides the pupils were irregular and the reaction slow. To find such a limited involvement was in Dr. Weisenburg's opinion indeed rare. Another interesting point was the fact that the examination of the spinal fluid showed a normal cell count, whereas from the symptoms one would expect quite an increase.

Dr. Weisenburg stated that because of experience he had learned not to depend upon the Wassermann test. Altogether there had been eight tests of the serum and the fluid made. In conjunction with Dr. Uhle he had been investigating the work of the different laboratories and had found that very frequently the reports were not alike. This is because of the difference in technique, and the variation in the reagents. As a consequence in any doubtful case he has learned not to depend upon one test.

Dr. Isaac H. Jones read a paper on ear examinations to aid intracranial localization, with a report of eight operations, and one autopsy. The brain in this case showed that the ear tests had correctly localized the cerebellar tumor.

Dr. Fisher said that at the University Hospital Ear Dispensary where under the guidance of Dr. Randall they turned the patients and douched their ears, they were impressed with the regularity of the responses in normal individuals, so that he was convinced that whenever we get any abnormal response there must be something wrong somewhere. This subject is practically in its infancy. The distribution of the vestibular tract

is very wide and there is still a great deal to be investigated. We are on the threshold of this most interesting work and he hoped that with the aid of the neurologists they will be able to make it of great practical impor-. tance in the near future.

Dr. B. Alexander Randall said he took up this matter with Dr. Jones with main reference to the more conspicuous matter of nystagmus and had not done nearly so much personally in respect to the pointing reactions as has been done by Dr. Jones. Especially interesting are the contradictions of these cases, and they do occur, in which there are findings in some respects anomalous and not fully bearing out their expectation, yet it has been valuable to find how commonly they are correct and how well they enable them before operation to suggest in cases presenting marked cerebellar symptoms that this is adventitious and due to generalized pressure. They have been able to hold their ground once and again in regard to their findings when these made the suggestion that there was no cerebellar disease. On the contrary they have sometimes made a positive diagnosis and localization and had it borne out by operation or autopsy. Therefore these tests, while by no means infallible, will prove of more positively localizing value for the posterior region than the ophthalmic tests. So with regard to the tests Dr. Randall thinks they are going to present, the more they study them, the more minute differences and anomalies. He believes that they will from that very fact present a wide range of new discoveries which will be of distinct value. We are on the way to further differentiation of the trunk called the eighth nerve, which we have long since separated into the cochleal and vestibular, and just as the macular bundle of the optic nerve has been defined, we are going to find which of the various tracts lead from each part of the acoustic apparatus and also trace them to their deeper distribution in the nuclei and even in the cortex of the cerebellum and possibly of the cerebrum.

Dr. Weisenburg said that Philadelphia neurologists were indeed fortunate in having gotten Dr. Jones interested in this work. When in London during the International Medical Congress Drs. Mills, Dercum and Weisenburg had become interested in Dr. Barany's work and were impressed with the value of it, and on their return Dr. Weisenburg prevailed upon Dr. Jones to take this work up. Dr. Jones had imported all of the apparatus of Barany. It takes about six hours to fully examine a cerebellar case and Dr. Jones with the assistance of Drs. Brum and Fisher had done this work cheerfully and well.

The value of the pointing reactions as an aid to cerebellar localization is now beyond dispute, although we have not as yet arrived at the stage where we can say that certain pointing reactions indicate different lesions of certain parts of the cerebellum. He had seen nearly all of the work of Dr. Jones and would like to quote only two cases. In one in which Dr. Jones had made the diagnosis of a lesion in the quadrilateral lobe in one side and autopsy demonstrated a lesion in this area. This was a case of Dr. Potts. In the other instance studied by him, and in which a postmortem was obtained a lesion was again demonstrated in the area previously diagnosed by Dr. Jones.

Incidentally Dr. Weisenburg desired to put on record an observation which so far has not been previously recorded. In a cerebellar case in which Dr. J. S. Rodman operated for him, with Dr. Mills, and under their combined direction Dr. Rodman stimulated the cerebellar cortex by means of a unipolar faradic current, distinct responses were obtained. A more complete record of these observations will be published later.

Dr. Spiller said he had been one of those who had seen Barany demonstrate his methods in London and had been much impressed. Further clinical and pathological studies were necessary to determine the application of these tests.

Dr. Charles S. Potts said it seemed to him from what little experience he had had with this method that it will at least be a valuable confirmatory test. Without some of the usual clinical symptoms it would hardly be justifiable to make a diagnosis of cerebellar disease by these tests. Absence of these phenomena also should not prove that cerebellar disease was not present if the other symptoms present indicated it. Dr. Potts said he had made a diagnosis of tumor and localized it in the left lateral lobe before sending the patient to Dr. Jones, but did not tell him what his opinion was. Dr. Jones localized it in the same place by means of this test. This boy had adiadochokinesis in the left arm, and some slight asynergy of the left leg. When the finger to nose test was attempted with the left arm the finger went past the nose. He also had papilledema in both eyes and three months after the symptoms first appeared he became absolutely blind, without, so the ophthalmologist says, any evidence of atrophy or without any retinal hemorrhages.

Dr. Charles K. Mills said he had been much interested in the Barany tests, especially since he with Dr. Spiller, Dr. Weisenburg, and Dr. Dercum were present in London at Dr. Barany's demonstration. He became convinced that there was something of diagnostic value in them, and because of this interest he had sent patients to Dr. Jones and in various ways had tried to stimulate this method of research. His feet were not, however, as yet firmly planted in regard to results and for that reason he did not feel competent to discuss the subject with any thoroughness. Dr. Jones did not bring out fully—probably did not intend to do so because of the scope of his paper—the points of differentiation between the lesion distinctly involving the eighth nerve, for instance, in the cerebellar pontine angle or in the labyrinth, or in some subdivision of it and one in the cerebellum itself. He thought perhaps we had in the Barany method ways of determining something with regard to the distribution of the different subdivisions of the vestibular nerve in the labyrinth to the different nuclear groups in the oblongata and probably also to the deep nuclei of the cerebellum, and to the posterior longitudinal bundle. Dr. Mills said that he had postulated some years ago the existence of a cerebral center of representation of the vestibular nerve, that is of a cerebral orientation center. Some of the phenomena elicited by the Barany method are dependent upon the reciprocity of action between the cerebrum and cerebellum.

Dr. J. S. Rodman said he would like to congratulate Dr. Jones on opening up this most promising field of diagnosis. In the first case on which Dr. Rodman operated, and which was reported by Dr. Jones, there was nothing discovered at operation beyond a bulging of the left lateral lobe of the cerebellum. This lobe was explored with a needle for a subcortical cyst, none was found. Under the supervision of Drs. Mills and Weisenburg the cerebellar cortex was faradized. In the other case at the upper left angle of the exposure there was an area of softening which apparently Dr. Jones had localized. It is of great interest to surgeons to feel that something more has been added to the diagnostic methods of localization of these lesions.

Translations

THE DREAM PROBLEM[1]

By Dr. A. E. Maeder

ZÜRICH.

(Translated by Drs. Frank Mead Hallock and Smith Ely Jelliffe.)

" O. related the other day having been with three students, that they had been drinking and had kept on talking from 9 P. M. to 3 A. M. about women. One of them had spoken on the subject in four different languages. I was unpleasantly surprised, as I had thought O. to be very abstemious. He told what difficulty Dr. D. had with his dietetics and of a protest made, quite unjustifiably, by the students against a professor. I like best the German spoken by the Hannoverians. I don't like the Swiss dialect. The new bathing master told me at once that I must be from the North, he noticed it in my speech. That pleased me." [The conflict between north and south has an individual psychological meaning for our young man. North is for him that which is the correct, controlled element in himself, which he values, while south is for him the meaner element of letting himself go.]

From the conversation about Dr. D. we get the following associations :

" The opposition Dr. D. has met with in the town, the fight against it. I again think of the students and their protest. It is quite remarkable that my leg has quite healed, doctor. I was quite surprised, it had been so bad. My sister, D., goes on the 15th to a woman gynecologist. I have lately had a peculiar feeling, something that cuts, as if I had something in the lung, in an important place, as if something had been cut off in my chest, as if an axe were cutting inside me all by itself. How can I change

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[1] A paper read at the Congress of the Psychoanalytical Society at Munich, September, 1913.

it? What shall I do? Now it is done differently, but how?
How shall I explain the wound?" [the youth's wound is on the
right leg, which explains the previous slip of the tongue; he iden-
tifies himself with the horse. He has a curious wound on the
back of the foot, which always appears when he is in conflict,
and which only heals at the times when he is psychically well.
The magic lies in this, that during times when he is psychically
ill, he keeps this foot, whilst at work, under the foot of the chair
on which he is seated; this sets up a persistent mechanical irrita-
tion which will not allow the wound to heal. He now under-
stands this and avoids sitting this way. But as he has not yet
found the right outlet for his libido, he must continue to torture
himself—symptom of the gathering libido—and for this reason
we find the new substitute sensation of the cutting himself].

The conversation now takes up the check number.

" It is the check number one receives in the waiting room of
Dr. D. The other day a gentleman is supposed to have taken
the number away with him by mistake. People are provided
with numbers. I wonder how it is at G.? [A school to which
the dreamer is to go after he is cured.] I am better, but if I have
a relapse, shall I be able to get through it alone? Something still
prevents me from overcoming the thing. Miss K. has not got as
far as I thought; she is still too hesitating. Miss S. is in bad
shape these days." [Two of my patients.]

Now we shall associate the phrase " I offer to take the number
back to Dr. D."

" Out of politeness [he is exceedingly courteous, partly as a
covering], it represents an evil number; for instance my con-
duct during the affair in the sleeping compartment of the train.
[He refers to his indecision during a homosexual assault, when
he yielded, although he had clearly understood the situation, and
had urged himself to be firm this time.] R. [a school comrade,
also homosexual, a bad number] Miss v. X. I am angry that I
still think of her and dream of her often."

THE ANALYSIS

If we use the material, thus obtained, for interpretation, we
find, in the first place, in the surface layer, on the objective level
(to use Jung's excellent expression) the following:

The blue horse is the beloved, who is already indicated by

the first ideas that came in the association (the ice bird expresses her northern quality, the ape her sensuality, which is further illustrated by other associations; her wish for the air bath and especially the wish for drink at the hotel). The horse represents more—the girls who have a magnetic effect, the mother, whose sexual significance is brought out by the scene in the bath during childhood.

The green officer, his model, is the dreamer himself, who rides the horse, his beloved, with whom he made the tour (ride) that time. A parallel to this is furnished by the first part of the dream: the forbidden bathing institute, which we have not considered here as being altogether too long. His sister, who here replaces the beloved, is the one with whom he carried on most of his childish tricks and for whom he has a strong transference.

The officer examines the horse with the boy. The latter is also identified with the dreamer, naturally as his meaner ego, the ignoble and unaristocratic in him (the south German). The youth has also been drinking on the tour, like the stable boy and the student in the story of Harringa. On this occasion the drinking nearly caused a misfortune (the above mentioned difficulty, the strong excitement). This identification helps us to understand why in the chain of associations about the stable boy there came up unexpectedly the memory of the seduction scene with his mother when he was in the bath. By the choice of this symbol the dreamer measures his own value, saying " I am also a low down fellow."

The rider and the boy examine the injured fore leg of the horse. One has been riding the horse too hard. [After thought of the dreamer.] The leg, as phallic symbol, is sufficiently determined by the student in the novel, who acquired a venereal disease whilst drunk, and also by the sexually diseased comrade— Y. In the same association, we have also the masturbation, against which our dreamer has been fighting in vain for some time. He suffers from his laxness, for, taking him all in all, he loves the strenuous and controlled. Latterly it has happened that during masturbation orgasm has not occurred. To all this belongs also the complex concerning the wound in his own foot, which will not heal [a pretty parallel to the wound of Amfortas in " Parsifal "] and the strange sensation of cutting his own flesh.

Accordingly, the dreamer is also identified with the horse (by

means of the injured leg). And so we have arrived at the lower stratum, or what Jung calls the subjective-level. The horse becomes a symbol of the libido; a symbol of his own libido. In this stratum, note well, all symbols refer to the dreamer himself, and they are to be regarded as personifications of the different tendencies of his psyche. What on the objective level was designated as the symbol of the beloved, becomes, on the subjective level, a symbol of that libido which has a tendency towards the object (the tendency is symbolized by its goal!).

This part of the dream tells us then. L. (the dreamer) has ridden too hard, something is not right with me, and must be looked into. A serious complaint (the legs of the horse, the vital organ in his chest, which hurts him). That is to say, insight is dawning on the mind of the dreamer. After external separation from the beloved, the youth remained in correspondence with her for over a year, therefore, he was still intensely bound up in her internally. Because of the analysis he feels impelled to break with her, as he gradually came to see—although merely intellectually—how harmful this adventure had been for his development (for mentally he was strikingly backward). Inwardly he was not willing at the time to break with her; but he hid himself and his opposition behind me, the scapegoat. This dream shows us a further step in the youth's development. His insight into his situation, the correct valuation of his adventure, becomes at the time of the dream emotional, not merely intellectual. This insight with the double character of intelligence and affect, is very significant and forms a cardinal point in the cure by analysis; for whoever possesses this insight is really acting on his own principles and conviction and thereby occupies a different relation towards the analyses than at first. The physician is no longer one who asserts this or that; something which one accepts or rejects, according to the predominance of the positive or negative attitude, but he has become a leader who sees and points out what one carries in oneself and only recognizes with difficulty; the physician is now he who helps one to know oneself better and how to rule oneself.

The insight of the youth does not tell merely that he is sick in his inner life, it says more: I employ my libido badly, I injure myself by using up so much libido on a lower level (the stable

boy). The youth is at good times an extremity bright, nice, able fellow. This side of him suffers from the other side of his nature; he longs for a regulation of his internal conditions, for a liberation of his soul. On the day after his dream, he told that a foreign word had persecuted him for some days, the meaning of which had quite escaped him—"chasteté" (chastity). It is in fact this he longs for, with this he would recover the peace of his conscience, with this he would attain the valor of his ancestors— he who had for years muddled through one school after another and had almost been given up, even by his parents.

In our own speech we would designate this longing of the youth as a tendency towards the domestication of his libido

The last part of the dream which deals with the conversation about the doctor and the number, is little plastic in its manifest content, and is poor also in its latent content. The reason, I consider, lies herein, that an entire side of the problem of the development of the libido in the youth is still untouched, he is not yet capable of clearly viewing the realization of the insight he has won, much less of bringing it to pass.

Otto, with whom he is conversing, is in his ambivalence a clearly recognizable identification of the youth himself. He is, on the whole, a very serious youth, already a student who stands up against his colleagues for the professor (in the matter of the protest), although he listens to the talk about women. He speaks of Dr. D.'s difficulties, his fight in a good cause. Fighting is, in fact, the formula for the new life of our dreamer, after he has followed till now almost exclusively his own desires and inclinations. Dr. D. stands, for him, in the place of duty, demands, conscience; he also calls him, occasionally, his conscience. To him, whom he has so long feared and avoided, he will take back the number, which sounds decidedly conciliatory. Even if the motive is still, perhaps, actually to be called courtesy, a quite progressive tendency is hinted at, as in the conversation about abstinence from alcohol. The evil number should be given up, renounce evil. Doubts still appear, "Will I be able to control myself unaided in the event of a relapse?" The occurrence of the symbol north in this connection strengthens the progressive tendency, for it signifies for him self control (contrast between the correct north German and the less self-controlled Bavarian).

This imperfectly coördinated segment is for me a symbolic expression of the future and as yet insufficiently elaborated material. Of this I see a confirmation in the fact that the principal stress of the manifested dream is laid on the wonderfully beautiful blue color of the horse, by which, in my opinion, is expressed how strongly the dream is bound up in the enjoyment principle, how great an attraction enjoyment still holds for him. This picture contains a valuation, which may serve as a standard for the dreamer's attitude. The task before the dreamer is the conquest of the kingdom in which the reality principle, to use Freud's excellent expression, reigns. We have already stated that this is a point of cardinal importance in the analysis. It is the lowest point reached in the analysis, and which also indicates at the same time the beginning of upward progress.

Quite briefly, I shall point out two other parts of the dream analysis. The psychoanalyst does not appear merely as physician, in the last part; but also in the middle portion of the dream, namely, hidden behind the boy and probably also under the form of the officer. These two conduct the examination. The dreamer's identification with the boy, points to the negative side of the transference he feels towards his physician; the physician takes the place of the father whom the dreamer fears, it is he who exacts, who is the cause of the break with the youth's beloved; he is not noble (therefore common), not a north German (Swiss has for the dreamer the same significance as south German). But gradually the physician has become to the youth a model in some points, as was once the father of Miss von X. in some respects. Thus the dreamer identifies the two models. My final remark refers to the first part of the dream, which, however, I will not go into in detail, in order not to be too lengthy. This part of the dream contains essentially a pictured representation of the childhood and early youth of the dreamer, a time which was crowded with all sorts of tricks, mostly in company with the sister already mentioned. This part belongs necessarily to the gaining of the youth's insight, of which enough has been said; it completes the account of his life. I must add that the youth was advanced considerably through this analysis, and that he attacked the further solving of his problem with great earnestness.

Significance of the Manifest Dream Content

The analysis here presented shows that I attach a greater importance to the manifest dream content than Freud has done up to this time. I think Jung is of like opinion, but I have never spoken with him about it specially. I don't wish to place myself in opposition to Freud in this matter, but would regard this new point of view as a broadening out of the present interpretation. The opposition to the Freudian attitude takes the place of the teaching of the official psychologists, whom, for want of a better word, I shall call classical psychologists, and who recognize no psychic value whatever in the dream, and make no distinction between the manifest and latent dream content. Freud, on his discovery of the latent dream content, was obliged to lay the principal stress on this, to the detriment of the manifest content. The complementary or perfecting idea which I suggest to-day, is therefore to be regarded as a portion of the excursion described by all discoveries. The above indicated conception of the manifest dream content will in due time induce a revision and an extension of the idea of the " secondary dream work," which probably at present is stamped too deeply with the teaching about repression, and thus in my opinion places the manifest dream-content in too one-sided a light.

From the example given, it is obvious that there exists a close connection between the latent and the manifest dream-content. This seems to me a distinct advantage for the synthetic conception of the dream. The manifest dream-content, translated by means of the materials of the latent dream-content, grants us in a symbolical manner, a picture of the entire situation, or a course of development of the unconscious processes, the activity of the libido.

The assumption, made in the present dream analysis, that there exists a direct relation between the plastic-figurative or vaguely outlined manifest dream content, and the clarified mature or confused state of the unconscious conflict, has been confirmed in my analyses during the past months, so that I am inclined to assume that in the manifest dream-content we are dealing with intra-psychic perceptions and pictures of the unconscious situation (according to Freudian terminology), or with auto-symbolic phenomena (according to Silberer). I would like to submit

these points to my colleagues for investigation. The question of the appearance of disagreeable affects in dreams takes on a different aspect in my further interpretation of the manifest dream-content, than it possesses when we accept "wish fulfillment" as the basic formula of the dream. The affect is usually entirely adequate to the actual situation. It is well known that there are dreams that remain impressed upon the memory particularly clearly, and are remembered for years. I have been able to prove repeatedly, that these pregnant dreams are the adequate expression of a clarified psychic situation. This probably applies also to many so-called "typical dreams," to recurrent dreams, and perhaps also to a quite different group of phenomena, that is, to certain cover-memories of childhood. These expressive dreams may be regarded as hieroglyphic milestones in the course of development of the personality, which lead for the individual to typical life adjustments or to typical reactions.

This insight has become very valuable to me for the stages of the development of the neurotic conflict, or more generally speaking, for the development of the personality itself. As a matter of fact, the careful examination of the pictures of the manifest dream-content is seen to yield a representation of the progress of this development. The dream of the blue horse will be recalled, where the youth shows the insight that his libido needs attention, as its functions were disturbed by previous events in his life. Some weeks before this, during a period of strong resistance, the patient *dreamed of people who were swimming through a canal. In a small boat stands a strong man, who captures the swimmers with a harpoon. He himself (the dreamer) looks on, but feels a deep indignation and hatred for the cruel "fisherman."*

<center>(*To be continued*)</center>

Periscope

The factors operating in either the ontogenetic or the phylogenetic differentiation of the correlation centers of the brain cannot be profitably investigated without a precise knowledge of the peripheral relations of each functional system represented in these centers and of the interrelations of these systems at every step in the progress of the nervous impulses transmitted by them during the course of normal functional activity.

In the analysis made by this author of the central course of the cranial nerve roots it has been found, he states, that the individual fibers of each sensory root of the V, VII, VIII, IX and X nerves bifurcate immediately upon entering the medulla oblongata into ascending and descending branches. The ascending and descending fibers of each root are united into distinct fascicles which retain their individuality from the superficial origin of the root upward and downward respectively throughout nearly the entire length of the oblongata. All of the somatic sensory root fibers divide in this way and many, if not most, of the visceral sensory fibers also do so. From this it follows that the white substance (stratum album) of the sensory region of the oblongata from the level of the spinal V tract dorsalward contains a series of longitudinal fascicles of root fibers, each of which is a functional unit and whose fibers are distributed peripherally to a particular species of sense organs. These fascicles of root fibers occupy the entire stratum album of this part of the oblongata, save for the presence of two additional bundles of correlation fibers (the tracts a. and b. of Kingsbury) and for a variable amount of a superficial neuropil in the marginal zone of the white substance. This arrangement is preserved throughout the length of the acustico-lateral area of the oblongata.

The neurones of the gray layer (stratum griseum) of the sensory region of the oblongata send their dendrites outward to arborize among the terminals of these root fibers and the synaptic connections here effected are made in accordance with a definite functional pattern; but this pattern is far less simple than that of the root fibers and there are few groups of neurones of the gray substance which can be regarded as the specific or pure terminal nuclei of particular functional systems of sensory roots. Most of these neurones effect synaptic connection with the white layer with more than one physiological type of root fibers, from which it follows that the function of primary receptor centers and correlation centers are in these cases united to some extent within the individual neurones of the second order. The white substance of the medulla oblongata of these Urodeles contains, in addition to the motor and sensory root fibers, a large number of correlation fibers, and the longer systems of these fibers are arranged in definite correlation tracts.

From the relations described in the preceding paragraph, it is evident that correlation tracts are intermediate in physiological type between those

of the spinal cord of these larvæ and those of the oblongata of mammals. In the spinal cord of larval Urodeles there is little evidence of localization of function in the sensorimotor apparatus, but each of the larger correlation neurones (and many of the peripheral motor neurones also) seems to effect synaptic relations with the entire stratum album, to wit, with sensory root fibers of all kinds and also with all of the long correlation tracts of the cord. In the mammalian medulla oblongata, on the other hand, each functional component of the various sensory roots of the cranial nerves terminates in a specially differentiated end-nucleus, from which neurones of the second order conduct the nerve impulses of their respective sensory types either directly to the motor centers through the reticular formation or by long tracts to higher correlation centers. These secondary tracts transmit unmixed specific sensory excitations of the same functional type as the roots with which they are functionally related. Finally in the oblongata of Urodele larvae a third type of correlation neurones is found. The peripheral neurones of the sensory roots of the cranial nerves exhibit a specificity of function which appears to be as precisely localized as that of the corresponding mammalian nerves and to show essentially the same arrangement of nerve components in the cranial roots. The regional localization of the end stations of these various functional types of root fibers is tolerably precise and clearly defined. But the sensory neurones of the second order are not arranged in similarly circumscribed nuclei related respectively to these definite end stations of the peripheral neurones. On the other hand, practically all of the neurones of the adjacent gray substance send their dendrites into at least two and often into several different endstations, so that the same secondary neurone may be, and apparently habitually must be, capable of excitation by two or more diverse end organs. Thus, a single neurone of the oblongata may effect synaptic connection with glossopharyngeal fibers from taste buds and also with trigeminal fibers of tactile sensibility, with root fibers from the V and also from the VIII cranial nerves, or with fibers from the tactile sense coming in from the head by way of the V cranial nerve and with fibers of the tractus spinobulbaris conveying tactile impulses from the trunk region. Each sensory neurone of the second order in the oblongata is, accordingly, at the same time a correlation neurone and the apparatus for the sensory analysis of peripheral stimuli is greatly simplified as compared with the mammalian condition, though more perfect than that in the spinal cord of Urodeles. Nevertheless a certain degree of functional localization in the gray substance is evident. The fasciculus solitarius is the most distinctly separate bundle of root fibers and the related neurones of the lobus visceralis are evidently under the exclusive or dominant physiological influence of this system of root fibers. In the somatic sensory area the secondary neurones related with the V root fibers are tolerably distinct, though in all cases related also with other systems, particularly the VIII root, the secondary visceral tract and the underlying tegmentum. The neurones related with the VIII and lateral line roots form a fairly distinct group, the area acustico-lateralis, the more dorsal members of this system of neurones being related exclusively with the various lateral line roots (always with more than one of these roots) and the more ventral neurones having more diversified connections. In the adult the functional localization of specific terminal nuclei within the area acustico-lateralis is far more completely elaborated than in the larvæ. Though the physiological segregation of the secondary neurones into specific sensory centers is incomplete in these larvæ and few of the tracts

of the second order carry pure sensory impulses derived from a single functional system of peripheral root fibers, yet in most cases some one of these peripheral systems evidently dominates the pathway. In the further evolutionary history of these secondary pathways the dominant system in each case appears to have persisted to the exclusion of the subordinate connections, and the functions of correlation are thus transferred from the primary receptor centers to the reticular formation for the simple bulbar reactions and to the higher cerebral centers for the more complex reactions. We are, accordingly, able to recognize the mammalian equivalents of most of the amphibian correlation tracts, though the homology in all of these cases is incomplete owing to the imperfect segregation of the amphibian primary terminal nuclei of the cranial nerve roots.

The gray substance of the oblongata shows progressively more clearly defined areas of functionally distinct neurones as we pass from the spinal end forward. And the anatomical arrangement suggests that the capacity for diversified reactions is greater in those parts of the body innervated from the anterior end of the oblongata. Physiological observation, of course, shows that this is the case. In Amblystoma of different ages various forms of reflex connections are now known and these can be arranged in a graded series, starting from the primitive reflex apparatus of the very early swimming larva, which may be conceived of as suggesting some of the steps of the phylogenetic evolution of the mechanism of correlation as found in the brains of higher vertebrates. Coghill has shown that in the simple swimming reflex of the very early developmental stages of Amblystoma there is very little evidence of specificity of function even in the peripheral sensory neurones. Each of these neurones (the transitory giant cells of Rohon and Beard in the spinal cord) may connect peripherally with both the skin and the myotom, the cutaneous and the muscle sense innervation coöperating to maintain the swimming reflex. These transitory cells are in later developmental stages replaced by those of the spinal ganglia, in which the neurones concerned with cutaneous and deep sensibility are probably distinct as in higher vertebrates. In the spinal cord of the half-grown larva, however, the neurones of the gray substance show very imperfect functional localization, each of these neurones apparently being physiologically related to all types of peripheral sensory nerves. Here also any stimulus whatever on the trunk will evoke a simple swimming movement. In the medulla oblongata of these half-grown larvæ the peripheral neurones show a high degree of functional specificity, and the central neurones of the second order tend to be grouped around these special sensory groups. But the functional localization of these secondary neurones is not complete, each neurone having a dominant relation to some particular peripheral root but subsidiary connections also with other functionally distinct roots. Thus each primary bulbar center reached by terminals of root fibers is to some extent also a correlation center and the analysis of function in the reactions is still incomplete.

In the mammals the functional differentiation of the primary bulbar centers is complete and the functions of correlation are transferred to higher cerebral centers. Simpler total reactions of the more primitive sort are, however, still provided for in the formatio reticularis of these higher brains. The examination of the series of types of reflex pattern now known in Amblystoma suggests the dominance of the integrative function of the vertebrate central nervous system from its earliest phylogenetic phases. The simplest responses to external stimulation, such as

the avoiding reaction and the swimming reflex reaction of very young larvæ (Coghill), are simple total reactions involving the coördinated action of large masses of body musculature. Within such a unitary reflex system, which necessarily requires the orderly participation of extensive regions of the nervous system, more refined special movements may be differentiated, and this involves the segregation of particular functional areas within the original unitary system under the influence of the progressive differentiation of the receptor and effector apparatuses. Throughout this process of differentiation the correlation centers, as they become more individualized from the primary unitary system, are pushed farther and farther back from the periphery; but at no stage in the process is the primitive dominance of the integrative function of the system as a whole lost. The preservation of the functional integrity of the individual during the process of differentiation of its parts is the most important function of the higher correlation centers, as Sherrington has so graphically shown.

                                                                    JELLIFFE.

DEMENTIA PRÆCOX AND MALINGERING. E. Hesnard. (Arch. de Med. et d. Phar. Navales, 1914, No. 4.)

Inexperienced and prejudicial observers frequently look upon the foolish conduct of the early schizophrenic as malingering especially if a medico-legal judgment is required. It is the invariable attitude of the prosecuting attorneys. The early symptoms of dementia præcox are such as to lead the practitioner to suppose that his patient is only pretending to be sick. This is well set forth in this recent study on the Importance of Absurd Answers in the Diagnosis of Insanity. Patients suffering from dementia præcox, just after the first onset, are, he says, as yet so little changed, and their mental powers are so slightly impaired, that it is difficult for the alienist to convince the friends of the patient, and even his medical advisers, that he is not wantonly perverse, but, on the contrary, sick with a truly serious disease. Dr. Hesnard recounts his observations on a case, that of a man who, much run down owing to early phthisis, became excited one day in his barrack-room, and had to be sent to hospital. In hospital he soon became calm, and thereafter was generally vague and irrelevant in his answers to questions, and at times incoherent, though occasionally his answers were shrewd and amusing. He could be made to speak more rationally if he was sharply questioned and his slumbering self-control awakened. His friends thought he was shamming, and asked him what he was doing it for, and they pointed out to him that he need not sham to get out of the service, as he was going to be invalided for phthisis anyway. Dr. Hesnard, after considering the case closely, concluded that the patient was not a malingerer, and believed that he recognized in him the onset of dementia præcox. The man looked strange and haggard and always wore a weak smile. Quiet generally when alone, he became uneasy and agitated when observed. He mimicked his medical attendant cleverly and could talk brilliantly. These cases are very frequent and are at times made the subject of medico-legal inquiry. The patient described by Dr. Hesnard died of tuberculosis, a frequent cause of death in schizophrenia.

                                                                    JELLIFFE.

Book Reviews

PSYCHOPATHOLOGY OF EVERYDAY LIFE. By Professor Dr. Sigmund Freud, LL.D. Authorized English edition, by A. A. Brill, Ph.B., M.D. The Macmillan Company. New York.

A valuable contribution to the psychoanalytic literature available in our own language is made by the translation of this important and popular work of Freud. Dr. Brill's practical knowledge and understanding of Freud's theories peculiarly fit him for the difficult task of following this profound study and rendering the work in a sympathetic and trustworthy manner.

One is impressed with the simplicity in the complexity of the thought. For the material dealt with is the simple matter of everyday life, and, moreover, when first examined it seems so plainly revealed, so apparent. But careful reading reveals the depth of penetration which having discovered the hidden complexes, the repressed material of the psychic life, follows here by careful analysis and patient searching the intricate and extensive associative paths through which is made active the influence of the unconscious activities manifested in the ordinary forgettings, faulty rememberings, mistakes in speech, writing and actions of everyday life. In following the given examples with their complex analyses and the carefully deduced conclusions one is stimulated to earnest thought and a new appreciation of the value of our apparently most trivial actions as they reveal the tremendous influence of that part of psychic life hidden in the unconscious, largely the result of repression.

Freud has confined this study to normal subjects except when he has rarely introduced some special pathologic instance in order to confirm the importance and accuracy of his deductions or to show how the interpretation of remembering and forgetting bears directly upon the revelation of complexes otherwise difficult of access but of great importance in treatment. The facts of especial significance and value then are these: that the underlying causal factors for the phenomena of forgetting and the like are the same in normal as in pathological states, that thereby we see more plainly the close relation of pathological to normal states, thus better understanding both forms of manifestation, that we better understand the determinism that governs our mental activity. This is of ever-increasing applicability in the positive, effective treatment of pathological cases, in advance in psychological knowledge and in application of psychology to practical affairs of life as is already to be found in the examination of criminals.

Freud follows his study through various lines of investigation. He examines the phenomena of forgetting through its diverse manifestations and discovers the underlying motive of forgetting and of faulty recollection in the existence of disturbing thoughts in the unconscious. Either there is direct connection between the disturbance which comes to light as forgetting or as faulty substitution and the disturbed element or this relation exists through a chain of associations often complex and far-reaching, but not the less real and discoverable by patient analysis. Some-

times the forgotten element itself directly touches the repressed material, at other times it is accepted by associations that touch upon undesired material and thus altered.

The whole subject of forgetting and remembering Freud reminds us is an unknown one and this study of its causation and determinism is but the opening of a field yet to be explored. Surprising and unexplained memories belong here also. Unimportant events, the remembering of which occasions surprise, act as concealing memories for repressed material, which seeks these concealing memories as substitutes and hides itself in forgetting. Mistakes in speech, reading and writing are due to the same mechanism. Freud gives due consideration to philological, linguistic theories of sound associations but behind these often manifestly independent of them are deeper psychic influences following the same conditions already indicated; and these may have a wider linguistic interest in explaining not only mistakes but laws of speech formation. This is but one of the suggestive possibilities which this study offers toward a wider understanding and application of the psychological facts here investigated. The discussion is further extended to include the forgetting of impressions of experience, of resolution, erroneously carried out actions, symptomatic and chance actions and errors. Errors are distinguished as faulty recollections not recognized as such and as referring to the objective character of the material, something other than a subject of one's own psychic life. By whatever mechanism in all these phenomena the fundamental explanation is the same. The intended element is interfered with, attention is deviated by the hidden element. The former touches upon the repression and thus becomes unacceptable. The repressed element active in the unconscious and awaiting a suitable pathway for thrusting itself into consciousness appears under the guise of forgetting or mistake and comes to activity in consciousness in substituted form. The processes at work are those familiar through Freud's work on dreams, especially the mechanism of condensation, while the compromise formation is the same as that manifest in pathologic symptom formation.

There is a restriction in the many illustrations selected and in the following out of their analyses. While they are fully complete enough for the purpose of illustration and discovery of the causation, they are not as a rule worked out to their deepest roots, which would lead too far into the deeply personal for a popular and general work such as this. Among the profuse illustrations perhaps none is more instructive and convincing than the examination of numbers apparently arbitrarily chosen. This, too, is a path that could be followed into inexhaustible depths, but even so far as the discussion is carried here it speaks very decisively for the determinism that underlies all our actions and speech.

This study is of immeasurable value in the understanding of our own lives, and therefore the regulation of action and words, in understanding and judging our fellows and in its service in psychoanalytic therapy. The more carefully the book is studied the more is one impressed with the profound genius of the author which guides ever farther into those unexplored depths to which he has given us the opening key.

JELLIFFE.
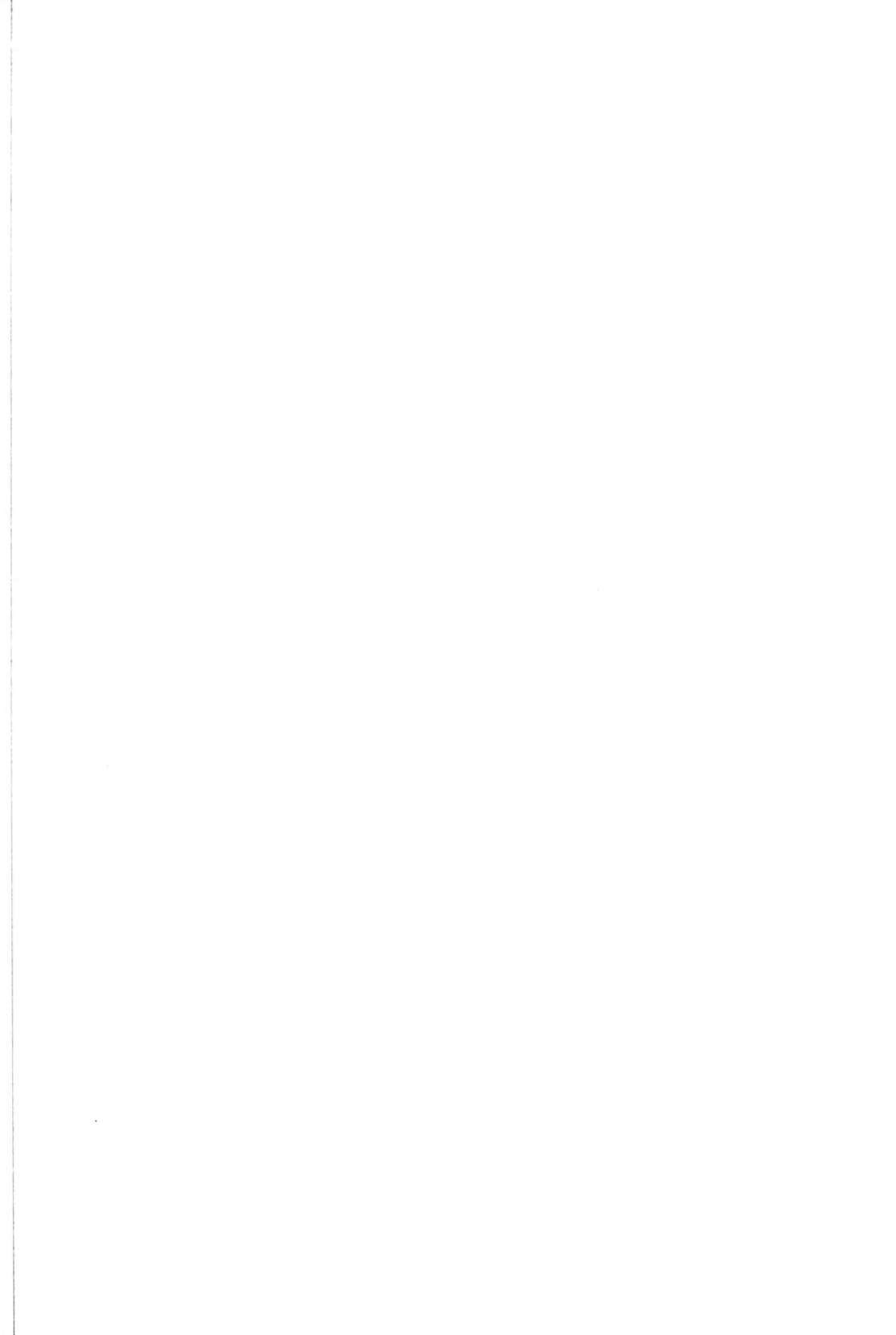
D'ORSAY HECHT, M.D.

The Journal
OF
Nervous and Mental Disease

Original Articles

D'ORSAY HECHT, M.D.

By Hugh T. Patrick, M.D.

D'Orsay Hecht was born in Albany, New York, January 31, 1874, and died in Chicago, of angina pectoris, February 16, 1915.

Dr. Hecht's childhood and youth were passed in Milwaukee. At the age of eighteen he entered the University of Pennsylvania, but in his sophomore year severe illness interrupted his studies, which he was unable to resume for several years. Later he entered the Northwestern University Medical School where he was graduated in 1897. He served as interne in the Michael Reese Hospital and then went abroad for general work in Vienna, Berlin and Paris, taking, however, particular interest in nervous diseases. On his return he became associated with the late Christian Fenger, but surgery had no lasting charms for him.

In October, 1906, he was made assistant in the neurological department of Northwestern University, where he earned rapid promotion and at the time of his death was associate professor of nervous and mental diseases. He was also neurologist to the Michael Reese and Wesley Hospitals. The Chicago Neurological Society he served as secretary-treasurer and as president with exceptional zeal and efficiency. In 1910 he was elected to membership in the American Neurological Association and missed no meeting thereafter. He was president of the Mississippi Valley

Medical Association in 1914. In the neurology of Chicago he early made a place for himself and on it he left the impression of his attainments and personality.

For a physician of this day and generation Dr. Hecht was unusually versatile in interests and accomplishments. When only fifteen years old he was flutist in the Milwaukee Symphony Orchestra. At the University of Pennsylvania he was leader of the glee club and he became an accomplished pianist. Throughout a busy professional career he kept himself familiar with the composers, the music and musicians of the day. As a reader he was catholic in his tastes, wide in his range, always in touch with literary movements. If a masterpiece in any department appeared in English, German or French he was sure to know of it. In the same way he was interested in and followed the course of social and political movements, international, national and local. This catholicity was equally evident in his professional life. A practising neurologist, no discovery in medicine or surgery was indifferent to him and in the diversified field of nervous and mental diseases every problem caught his attention. But he was by no means a reader only. He was as well a facile writer and a ready speaker. Many graduates of the Northwestern University Medical School can testify to his excellence as a teacher. In short, D'Orsay Hecht was a talented and cultivated physician, ever mentally alert. But he was more. In his professional work he was always eager to know the very best and to use it. And he knew how. He had the clinical knack. In accord with his artistic tendency was a certain leaning to the dramatic but neither this nor self-interest ever interfered with sincere, conscientious effort for the best interests of his patient. With himself and with others he was honest: how honest and how sincere in the big things of life only his intimates knew.

Perhaps the most dominant note in Hecht's externalization was the personal. He liked to have and he had a strong if not striking personality of his own. He was interested in people. To him his patients were not mere cases. Rarely did he separate the work from the worker, the discovery from the discoverer, the book from the writer, the opinion from the man who held it. In his visits to Europe he was as much interested in meeting the great men as he was in what they were accomplishing. Always keen to know what men in other cities were doing, he was equally

keen to know the men themselves. No man cherished more his membership in the American Neurological Association. No man has been more alive to the scientific advantages of such membership. Probably few members have cared so much for the personal contact. In this, too, he was catholic. Not a single member was without live interest for him. This was not mere gregariousness. As has been stated elsewhere, he had the beautiful gift of admiration of others. Being exquisitely alive to the human factor in everything, he was a discriminating judge of men, sensitive to temperament in others, a nice analyst of character; no blind hero worshipper. But he did love his world and his world was largely human. He loved to know the best of it and to look up to it and to draw inspiration from it.

We may perhaps fairly measure most men in three dimensions by what they aspire to do, what they like to do and what they do. Measured by this standard D'Orsay Hecht was a full-sized man. His aspirations were high; he liked to do the broad and the clean thing; what he had done was above reproach and bourgeoned big beside his years.

At the meeting of the American Neurological Association, May 6, 7 and 8, 1915, the following resolutions regarding Dr. Hecht were unanimously passed:

On February 16, 1915, Dr. D'Orsay Hecht, an honored and efficient member of this association, departed this life at the age of forty-one years.

Dr. Hecht was an earnest student of neurology, a successful teacher and an able practitioner. He was a man of varied culture, a clear and pleasing writer, a fluent speaker. Of high ideals and positive opinions, he had the grace of a broad liberality and the happy gift of admiration for others. He was the best of comrades and the most loyal of friends.

Therefore, be it

Resolved, that in his death the American Neurological Association has sustained a real loss and that we, the members, mourn his untimely end, and that we extend to his mother and sister our profound sympathy.

PRESIDENTIAL ADDRESS TO THE AMERICAN NEUROLOGICAL ASSOCIATION

EXACT AND INEXACT METHODS IN NEUROLOGY AND PSYCHIATRY

By Geo. W. Jacoby, M.D.

It has been said that being upon the threshold of a new era of national expansion, our own specialty of neurology and psychiatry must keep pace with general progress and become energized along yet unexplored lines. Whether or not this be true, I cannot bring myself to believe that we will achieve any acceptable measure of success, if we allow the momentary glamor that inexact methods of investigation cast about them, to divert us from those principles of scientific study that have heretofore served us so well and which alone merit being called "exact."

You will have noticed that although addressing the American Association of Neurologists, I have referred to neurology and psychiatry as representing but one branch of medicine. This I have done because it has been the manifest tendency for these two fields to become ever closer and closer in their relations to each other. While the rest of modern medicine shows a deplorable inclination more and more to split up into special fields, neurology and psychiatry show an unmistakable disposition toward amalgamation. This is most gratifying. A generation or two ago matters were altogether different. Then neurology constituted a branch of internal medicine, while in most universities psychiatry was not at all taught or, as was yet the case in one European university at the time when this association was founded—in 1874—was taught by a member of the philosophical faculty.[1]

That was the period when the "soul" was looked upon as a special independent unmaterial entity and therefore not subject to the laws that govern bodily life. The "soul" was sought in the ether, beyond the clouds, everywhere but there where it actually is—in the body.

[1] Koenigsberg.

This attitude remained unchanged until the inductive method of investigation brought experimentation also into the field of psychiatry. Then it became only too evident how dependent were the psychic functions upon material formations, the brain and nervous system. The more progress was made the more manifest became the dominating rôle that the nervous system played in bringing about the bodily as well as the mental manifestations of life. In the light of modern science the bodily and psychic functions are but different forms of the same brain and nerve activity. And it is this recognition that joins neurology and psychiatry into one inseparable whole. To-day we can speak of neurology in an extended sense as well as in a restricted one. Neurology in its extended sense is no specialty but bears the most intimate relation to all branches of medicine in so far as the activities of all the organs of the body are innervated and all bodily functions are activated and regulated by the nervous system. On the other hand, neurology in its restricted sense confines itself to the investigation of those molecular changes of brain and nerve substance that bring about sense impressions and by means of the association paths elicit those reactions which we denominate psychic processes. From this point of view neurology represents the basis of psychology as well as of psychiatry. To be more exact we should speak only of brain and nerve physiology instead of psychology, and of nerve and brain pathology instead of psychiatry. It would be most deplorable should the attempt so often made to bring about a dissociation between neurology and psychiatry meet with success. It is manifest that scientific investigations of the diseases of one and the same organ, even when, in view of its complicated physical and psychic functions, they are conducted in different ways, will be best promoted by combined organization, and by a conjoined and correlated effort. The teachings of Griesinger and Westphal already served to implant and to fixate the fact that the study of mental disease, that is brain disease, cannot be conducted with any hope of success unless continuous consideration be given to the other diseases that may affect the nervous system, and that the study of neurology is in many ways supported and assisted by the study of psychiatry. The truth of this at once becomes evident when we consider how impossible it is to separate the neuroses and the psycho-neuroses and recall that most

mental diseases manifest themselves not only in disorder of
judgment, volition and psychic activities of other kinds, but at
the same time also show disturbance of reflex action and dis-
order of other physical processes. I am sure all of us have
noticed how more and more the conviction is spreading among
neurologists and psychiatrists that their two specialties are be-
coming interwoven and cannot be dissociated. Certainly unless
there be harmonious coöperation in these two fields of medicine
no understanding of the borderland states of nerve and mental
activity as well as of other unsolved problems can be attained.

The more stable the notion becomes that it is unscientific and
would lead to inexact methods of study were the correlated
branches of medicine, neurology and psychiatry, to be artificially
separated, the more favorable is the outlook for the future de-
velopment of both of them. If we now ask ourselves to which
methods our specialty owes its past success, and which investiga-
tional direction promises the greatest future progress, it must
be self-evident that those methods only can be recognized as
exact, as scientific, that stand upon the groundwork of fact. The
method of speculative investigation that constructs theories as
to how things should be or how things might be from its imagina-
tion alone, or draws unwarrantable generalizations from single
observations must in our work be relegated to the forgotten past.

Among the exact or scientific methods of investigation which
through their accomplishments have earned a place of standing
in neurology and psychiatry, I count above all clinical observa-
tion, the oldest and best tested auxiliary of the entire science of
medicine; furthermore anatomic-microscopic examination of the
structures of the body, furthermore the microscopic examination
of the blood and other fluid components of the body, among
which must be included above all the complement fixation test
of Wassermann with its various modifications, Abderhalden's
sero-diagnosis, or test of organic function, as well as the exami-
nation directed toward a study of the secretions of the ductless
glands. In the light of past experience no one of these methods
can of itself bring about the scientific progress we desire, and it
would be an error to rely upon any one method and neglect the
use of the others. They all supplement and control one another
and what one cannot bring about of itself they all effect when
employed together.

It can of course not be my purpose to enumerate all the individual advances, so well known to you, that neurology and psychiatry have made; all I desire is to map out the main routes in order to indicate the direction that future investigations will have to take.

More and more has clinical observation taught us that in the field of neurology and psychiatry as in all other fields of practical medicine, we must learn to individualize. Health and disease are not antagonists; they represent merely different manifestations of the same vital activity. According to modern views an individual is sick only as compared to himself and his own previous state of health, not as compared to an arbitrarily constructed "norm," and the very same manifestations which in the one are distinctly pathological may in another still lie within the confines of health. It is impossible to determine precisely where health ceases and disease commences. The one passes into the other unnoticeably by means of endless intermediary stages, and for this reason the borderlands play so important a rôle in all of modern medicine and in our own special field. It is for this reason we strive for an individual pathology, which must be predominantly conceived as a pathological physiology and above all represents the view that disease is a restriction of efficiency which varies from case to case. Present-day medicine no longer knows the division of human beings into two classes, the healthy and the sick, but deals only with individuals, no two of whom are precisely the same and each one of whom must be treated in accordance with his own individuality. This fundamental principle has by no means yet been adopted by physicians to the degree one would expect, and it is for this reason I have not considered it superfluous to refer to it again upon the present occasion.

Our diagnoses are still far too much cast in one common mold and our therapeutic ordinances are too little influenced by the modern principle of treating not the disease but the man.

By means of an individual pathology clinical observation will also succeed more and more in recognizing disease processes of nervous and mental life which to-day are yet very much in the dark. The anatomic-microscopic method of investigation seems at present to have come to a standstill. For decades it has held sovereign sway in all fields of medicine and also in neurology and

psychiatry, and that our specialty has been enormously advanced
through this method of study need at this late date not be un-
folded. Every one of us knows that only through anatomical
and histological investigations has a satisfactory basis been de-
rived for the recognition of the dependence of psychic processes
upon the constitution of brain and nerve tissues. In the course
of time, however, it has become more and more evident that the
gross and delicate structural changes that we are able to recog-
nize already represent the end products of disease from which
we can learn nothing regarding the beginnings of the disease
itself. This shortcoming becomes a veritable hardship in our
investigation of the nature of functional disturbances. True we
know that there are functional disturbances dependent essentially
upon morbid ideas. Others moreover are based upon variations
in the blood supply, upon the resorption of toxic materials, etc.,
although it is as yet not possible for us to demonstrate the
existence of any structural alterations. Yet in all these instances
cellular damage upon which the abnormal function is dependent
must exist. A priori we may assume that this cellular damage
is originally too minimal to be recognized by our existing micro-
scopes. We are then obliged to speak of " functional " diseases.
Gradually the destructive process progresses, until it can be
demonstrated upon the cadaver. Of course the direct proof
intra vitam of its existence is never possible. It still remains
for experimental investigation to cast more light upon this
problem. In animal experimentation alone, when the animal is
killed, and the process of disease interrupted at any stage of its
course, can each step of the instituted organic change be carefully
observed and a chain of events continuous from the beginning to
the end, be obtained.

In so far as conclusions from analogy are at all permissible,
that is, in so far as we are entitled to draw conclusions regarding
the behavior of human tissue from the comportment of animal
tissues placed under the same or similar conditions, experimental
investigation, beyond any doubt, still presents a wide scope for
activity in our field of work. This is shown by the more recent
experiments regarding the localization in the cerebral cortex.
Not only the localization of the anterior limbs in the lobus quad-
rangularis and of the posterior extremities in the lobus semi-
lunaris superior, but also the more precise localization of certain

directional movements within these areas has become part of our knowledge. It however appears to me that an essential prerequisite for favorable progress lies above all in our coming to an agreement concerning certain fundamental questions which are of importance not only for pathology but also for therapeutics. Here I will but recall the neuron theory. Quite generally at present the neurons or nerve units are looked upon as ganglion cells together with their pertaining dendrites and neurites, and their endings of delicate aborization. According to this theory there exists no continuous nerve network but only neurons connected by continuity and contact. By others, on the other hand, the significance of the neuron as a physiological and histological entity, is denied, and the fibrillar substance (neurophil) is looked upon as the bearer of nerve activity, while the ganglion cells are held to serve as nutritional centers for the metabolism of the nerve tissue. May this one indication suffice to demonstrate how far distant we still are from the goal that science desires to attain ; that of being able to recognize facts and to so explain them that no difference of opinion can exist. But just as the doctrine of the neuron is still far from a definite decision, so it would seem that the hopes placed in the Abderhalden method, which just now is very much in the foreground, are to be but partially fulfilled.

The literature concerning the theory of the defensive ferments has already assumed such enormous proportions that I shall limit myself to a restatement of the essential underlying principle. Abderhalden starts from the premise that all organs whose function is disordered cast off cellular components into the circulation. There, not having passed through the intestinal tract and not having been transformed or disintegrated into an assimilable state by means of the digestive juices, they act as foreign bodies and bring about the formation of defensive ferments in the blood. The defensive ferments so to say take the place of the digestion that would have resulted had these cellular components passed through the intestinal tract. The sero-diagnostic test now consists simply in bringing the blood serum in contact, seriatim with the various organs. Where these organs remain unaltered the proof is given that no specific defensive ferments are present (for otherwise the organs would have been attacked) ; where however, the process of decomposition can be demon-

strated by means of the ninhydrin test, this occurrence can be explained only by the presence of specific defensive ferments and for this reason the respective organs of the individual from whom the blood serum has been derived must be diseased, or no defensive ferments would have been formed. The theory seems very plausible. The technical execution is extraordinarily difficult and gives contradictory results when but the slightest error is made. Even when the ninhydrin test gives a positive reaction, we can never be sure that this is not due to the entrance of germs into the dialysation thimbles, the tested organs therefore being no longer entirely aseptic. Moreover the color distinctions are so delicate that under improper illumination the grossest errors may take place. Much complaint has been made of these sources of error. On the other hand many investigators have expressed their entire satisfaction with the method, provided it has been carried out with proper care and precision. Stress has been laid upon the fact that the Abderhalden test has a far greater value than the Wassermann test, as the latter is limited to the proof of the existence of lues. Fauser was probably the first to apply these tests in mental disorders and his results have been corroborated by subsequent observers, so that we are now justified in speaking of a special sero-diagnosis of nervous and mental diseases. There is at present much evidence before us tending to show that in dementia præcox, breakdown products of the protein of the brain cortex and of the genital glands, in dementia paralytica breakdown products of the cortex and of some other organs are present in the circulation and gives rise to protective ferments which may be demonstrated by the Abderhalden method, whereas in none of the psychoses and neuroses, known as " functional " and " constitutional " can the presence of such ferments be demonstrated.

While it may as yet be questioned whether all that has been expected of the Abderhalden method will become an accomplished fact it is even now certain that the method of investigation directed toward a study of the processes of inner secretion does furnish us with very serviceable results. Investigations of recent years have cleared up the relationship between a number of nervous and psychic disorders and the hypo- or hyper-function of glands of internal secretion especially of the thyroid, the hypophysis and the generative glands, and have made it seem neces-

sary to focus our attention upon these ductless glands as possibly being at fault in periodic asthenias of the nervous system as well as of the body in general. The alteration which we look upon as resulting from disorders of internal secretion are so characteristic, that their diagnosis to-day presents but little difficulty. The firmest support of this method has been the experiment. The removal of the thyroid, the hypophysis, the adrenals, the ovaries or the testicles in the animal is regularly followed by definite symptoms of hypo-secretion; the administration of this same organic substance to healthy animals by feeding or injections regularly produces symptoms of hypersecretion. Both hypo-secretory and hyper-secretory disorders thus artificially produced correspond entirely with the observations made in man when these corresponding organs have become diseased. I firmly believe that this method also will lead to further disclosures. Less valuable for neurologic and psychiatric diagnosis have been the microscopic and chemical examination of the blood. Very many investigators have demonstrated that certain nervous and mental diseases are accompanied by qualitative blood changes manifesting themselves as hyperemia, anemia, leucocytosis, polycythemia, poikilocytosis, etc. The findings are however not sufficiently characteristic to warrant any definite and invariable diagnostic deduction.

My own experience, covering thousands of blood examinations in cases of nervous and mental disease, in many instances extending over months and embracing a long series of experimental investigations regarding the alkalinity of the blood, has convinced me that their sole value lies in the possibility of recognizing complications dependent upon well-known disorders of the blood state itself and in differentiating some of the acute infectious processes of the central nervous system as well as in recognizing the presence of some organic basis for affections which upon their face appear to be of a functional nervous character. The blood changes often found in epilepsy and in the various psychoses, all come within the limits of physiological variations, or are due to some temporary accidental cause. In my estimation therefore the examinations of the blood in nervous and mental diseases have been of little value in advancing our knowledge of these affections. It may however, well be that the im-

perfectedness of this procedure will be overcome with an advance in our microscopic and chemical knowledge, so that we will then be able to recognize changes that at present still escape detection. All the methods I have mentioned are supported by facts which may be used as a basis for the advancement of neurologic and psychiatric knowledge.

All these methods effectuate something, the one more, the other less. They mutually complete and control one another. But we must not err in expecting too much from any one method and use that one to the exclusion of the others. Any deductions when based upon facts and arrived at without prejudice must be respected even when they differ from our own deductions derived from the same set of facts. Thus many of us will admit that the results of surgical intervention in cerebral neoplasms have been unsatisfactory, the mortality being great and the condition of the survivor frequently a deplorable one. So also we will subscribe to the statement that "the indefiniteness of gliomatous formations make them extremely unfavorable for operation," but when these statements are used as a basis for the deduction that "it is probable that compounds will be discovered that can be injected into the spinal fluid that will cause gliomas to shrivel in the same way that gummas disappear under the administration of potassium iodide, mercury or salvarsan," we must characterize the procedure as more or less fantastic. Nevertheless it is based upon fact and analogy and, being exact, may lead toward progress.

There is however, one method that of recent years has received much attention and which in my opinion is not only fantastic but also inexact and which I believe promises nothing for the future development of our specialty. This is the Freud-Breuer method of psycho-analysis. This brings us into the contested field of functional diseases proper, the psycho-neuroses, upon which I have but touched. I am perfectly ready to admit that here pathogenic factors may unfold their action in ways undiscoverable by the microscope, chemical analysis or experimentation, but in the endeavor to learn what these factors are we must make use of explanations only that are in accord with laws that have been recognized as natural ones. No argument is possible with any investigator who believes that in psychiatry any

but natural laws obtain, or whose exposition is dependent upon philosophic arguments, capable of course of proving anything that is desired.

While the Freudian method is not void of a basis that bears a guise of exactitude, inasmuch as it is an adaptation of association psychology, it nevertheless is essentially a system of psychology of the unconscious mind, dealing with inferences or hypotheses of dream construction, condensation, displacement, dramatization, etc., as though they were established facts, yet having adduced no proof of their correctness beyond that furnished by psychoanalysis itself.

All Freud's terms are purely metaphysical abstractions. The theory of repressed memories of sexual traumas in childhood, the repressed desires as revealed in dreams and the association test for unearthing repressed sexual complexes from the unconscious mind are all insusceptible of scientific proof and therefore inexact. I agree fully with Hoche in the opinion that the use of the psycho-analytic method would force neurologic and psychiatric investigations into false channels and that the teachings of psycho-analysis are theoretically and empirically based upon an inadequate foundation and its therapeutic value is unproven.

No persistent progress in the development of psychiatry and neurology can be possible if it be allowed to be swayed by an attempt to prove something by means of preconceived opinions which themselves first require to be proven. Long enough has our study of the psychoses allowed itself to be deluded by captious attempts to explain the causes of mental activity not from facts gained by experience but from imagination alone; long enough have observation and experiment been violated in order to make them accord with seductive theories.

Whatever progress has been made in our understanding of neurologic and psychiatric problems, certainly has in no way been due to psychoanalytic work.

I will now bring my remarks to an end, although many important methods of diagnosis and treatment have not been mentioned. It was my purpose in the main by the juxtaposition of exact and inexact methods to indicate the direction which the science of neurology and psychiatry would in future have to take should it not be hampered in its development.

STUDIES ON THE LOCALIZATION OF CEREBELLAR TUMORS[1]

I. The Significance of Staggering Gait, Limb Ataxia, the Romberg Test, and Adiadochokinesis

By Ernest G. Grey, M.D.

ASSISTANT RESIDENT SURGEON, PETER BENT BRIGHAM HOSPITAL, BOSTON

Introduction

The purpose of this paper is to discuss the importance of staggering gait, limb ataxia, the Romberg phenomenon, and adiadochokinesis in localizing newgrowths in the posterior cranial fossa. It is based upon an analysis of the records of forty-eight cases of tumor which involved the cerebellum either directly, or indirectly by pressure.

The material has been drawn from the records of a series of several hundred patients with syndromes of cerebellar diseases in the neurological services of Dr. Cushing at the Johns Hopkins Hospital previous to October, 1912, and the Peter Bent Brigham Hospital since that date. Most of the cases from the latter clinic have been personally observed by the writer.

The diagnosis and localization of the lesion were confirmed in all of the cases either at operation or on post-mortem examination. All records have been excluded which showed that the disease had extended into other parts or which included additional factors likely to confuse the symptom-complex.

The present report is the first of a series of studies which were suggested by the difficulties attending the localization of many cerebellar lesions. Notwithstanding the important contributions to this subject by Bruce, Bruns, Stewart and Holmes, Babinski, Mills, Oppenheim, Weisenburg, and numerous others, there still exists considerable uncertainty regarding the proper interpretation of a number of our clinical tests.

For therapeutic purposes a knowledge of the localization of

[1] From the surgical clinic of the Peter Bent Brigham Hospital.

subtentorial newgrowths is quite significant. In the absence of any apparent, unilateral changes in bone, dura or cortex it frequently justifies a thorough investigation of one or the other hemisphere. Though a radical measure this constitutes the only possible method of reaching many deeply situated tumors. A knowledge of the situation of the lesion, furthermore, may materially influence the operator in his choice of methods to approach the posterior fossa. The extensive bilateral explorations now in use are the outgrowth of this uncertainty in localization.

While tumors may arise in every possible position in the posterior fossa it is convenient for purposes of localization to consider them as occupying four principal regions, two within and two external to the cerebellum. In regard to the former we may speak first of the tumors which occupy a central position, that is, those which involve the vermis and more or less of the median portion of each lateral lobe; and second of those which lie wholly within one or the other hemisphere. In reference to the latter we may look upon the newgrowths either as occupying the cerebello-pontine angle, or as lying more or less between the posterior portions of the lateral lobes, dorsalward from the medulla and vermis. The data presented here is arranged according to this classification.

CEREBELLAR GAIT

Tumors Within One Hemisphere.—There were nineteen cases in which newgrowths—gliomata, endotheliomata and tuberculomata—occupied one or the other cerebellar hemisphere. On examination all showed some degree of the characteristic tottering or drunken gait. In nine the staggering was equally marked to either side, that is, the progression was along a straight path. A subsequent admission two years later in one instance revealed the same condition. From the history in another it appears that formerly the patient had deviated more to the side of his lesion.

In six patients there was more of a deviation toward the homolateral than toward the contralateral (as regards the tumor) side; they advanced, in other words, along a curved path the concavity of which was directed toward the hemisphere containing the tumor. Of these one gave a history of staggering equally in both directions, and another of lurching chiefly toward the opposite side. During four admissions in one and two admis-

sions in another the same deviation toward the homolateral side was noted.

A definite tendency to deviate in a direction contralateral to the side of the tumor was found in four cases. The history of one of these showed that previous to his hospital residence he had staggered more toward the hemisphere affected.

Tumors Involving the Vermis.—There were nine cases in which the tumors—gliomata and tuberculomata—occupied a central position in the cerebellum,—*i. e.*, they involved the vermis and to some extent the neighboring portions of the lateral lobes. In one the gait remained unaffected. An equal deviation to either side was noted in three patients. The lesion in one of these involved one hemisphere somewhat more than it did the other.

In five cases there was more of a deviation toward one than toward the opposite side. Of these, on pathological examination, three showed an unequal encroachment upon the lateral lobes. Two of the latter tended to swerve toward the more affected hemisphere while one inclined to the opposite way.

Tumors in the Cerebellopontine Angle.—Of twelve patients with lesions in one or the other lateral recess—endotheliomata and cysts—one had an apparently normal gait. In the remaining eleven the usual uncertainty was evident. Five deviated more toward the homolateral side. One of the latter, however, gave a history of staggering chiefly in the opposite way. Four swerved more toward the unaffected angle. Here again the history of one showed a deviation toward the opposite side. Finally, in two cases there was approximately an equal degree of inclination to either side.

Median Tumors Posterior to the Cerebellum.—Of three such cases—two ependymal gliomata and one angioma—the gait remained unaffected in one. In advancing the remaining two deviated more toward one than toward the other side. A slight weakness of the limbs in one of the latter on the side toward which he inclined, due to a pyramidal tract involvement, may have accounted for the deviation observed.

Discussion.—Most authorities agree that in tumors of the vermis the staggering or deviation occurs toward both sides, and especially backwards. In unilateral involvement of the cerebellum the deviation is thought by Lewandowsky (5), Stewart and Holmes (11), and others to take place almost always toward the

side of the lesion. This, however, is often corrected by the
patient, even occasionally with the eyes closed. The compen-
satory attitude thus established may result in an over-correction
with a swerving toward the sound side. The consistent findings
of Stewart and Holmes in this respect are disputed by Hom-
burger and Brodnitz (4), Oppenheim (7) and others. In Op-
penheim's experience swaying toward the side of the lesion
occurred only in acute cases and shortly after operative interfer-
ences. Starr (10) has reported staggering away from the lesion
in four fifths of the cases reported.

In our experience it is usually impossible to tell by the attitude
of the patient whether the deviation from the desired line of
progression is due to a forced movement arising from the injury
to the cerebellum or whether it is the result of an over-correction
toward the sound side. Patients with tumors occupying similar
areas in the posterior fossa and with illnesses of practically the
same duration have been found to swerve in opposite directions.

From the data just presented it is seen that in unilateral
lesions about forty per cent. of the patients showed no especial
deviation to one or the other side. In central lesions, on the other
hand, a deviation in one particular direction was as frequent an
occurrence as a staggering to either side. These findings lead to
the conclusion that while the démarche de l'ivresse or drunken
gait is probably the most characteristic symptom of cerebellar
disease, a deviation in one or the other direction has no signifi-
cance as a localizing sign.

The Romberg Test

Tumors Within One Hemisphere.—This test was used in six-
teen patients with unilateral, intracerebellar tumors. Of these
four fell or tended to fall toward the affected side. As is usual
the plane of falling lay half in a lateral and half in a posterior
direction. On a second admission many months later in one case,
the same condition prevailed.

The swaying or falling was chiefly away from the lesion in
five cases. One after an interval of three years showed an oppo-
site inclination, *i. e.,* he fell toward the homolateral side. Among
this group there were two in which the swaying was principally
backwards, and five in which it was equally evident to either side.

Of the latter, one patient displayed the same symmetrical unsteadiness during each of four admissions.

Tumors Involving the Vermis.—In patients with newgrowths involving the vermis three fell, or tended to fall, backwards. One was equally unsteady in all directions. The remaining cases, seven in number, swayed more toward one side. In four of the latter the encroachment upon the lateral lobes was unsymmetrical and the swaying was directed toward the hemisphere chiefly involved.

Tumors in the Cerebellopontine Angle.—Of thirteen patients with cerebellopontine newgrowths the swaying was directed toward the affected angle in six, and toward the unaffected in two. An unsteadiness equally marked in all directions appeared in three cases. In only one instance was a negative Romberg found.

Median Tumors Posterior to the Cerebellum.—The lesion—an ependymal glioma—in one of the three cases of this class rested upon the medulla and cord, causing flattening of the latter. The Romberg, contrary to expectations, was negative. The other two cases, an angioma and a second glioma, fell principally in one direction. As there was some weakness of the homolateral limbs in one of the two, however, this may have been responsible for the direction of the swaying.

Discussion.—Most authorities agree that patients with tumor of the vermis have a tendency to fall backwards, rarely forwards. Where a single hemisphere is involved Stewart and Holmes (11), Lewandowsky (5), and others believe that the swaying is consistently toward the homolateral side. It may be used, accordingly, as a localizing sign. Though both Mills (6) and Redlich (9) have noted a swaying to one or the other side in practically every cerebellar case, they hold to the view that it may vary greatly from time to time. The former finds that unless the disease is much advanced the patient usually is relatively steady on his feet. The failure of numerous cases to conform to the principles outlined, Lewandowsky attributes to complications arising from increased intracranial tension.

From the data just presented it is seen that in considerably over fifty per cent. of the cases the direction of swaying or falling bore no direct relation to the location of the tumor. Accordingly it is fair to conclude that while this test is useful in establishing a diagnosis of subtentorial newgrowth, a swaying toward one or the other side has no real significance in localizing the tumor.

Ataxia of the Limbs

Tumors within One Hemisphere.—No ataxia was discernible in one member of this class. While it was equally marked on either side in five (one had very little), in ten it appeared coarser on the homolateral and in two coarser on the contralateral side. Three of this group of ten showed the same relationships on subsequent admissions. One of the latter on a second admission exhibited greater incoördination on the affected side.

Tumors Involving the Vermis.—Limb ataxia was studied in eight patients with tumors involving the vermis. In all, with two exceptions, the amounts of ataxia on the two sides were quite dissimilar. It was vague in one of these and bilaterally marked in the other. The tumors encroached upon one hemisphere more than upon the other in four instances. Of these the ataxia was coarser on the side most affected in three and on the contralateral side in one.

Tumors in the Cerebellopontine Angle.—No ataxia was visible in two cases; in a third it appeared equally marked on the two sides. Of the thirteen members of this group ten exhibited more incoördination in the limbs of one side. The ataxia was more pronounced homolateral to the lesion in nine and contralateral to it in one.

Median Tumors Posterior to the Cerebellum.—Very little ataxia was evident in the cases of this group. In one it was entirely absent; in the remaining two it appeared only in the arms, and then to a slight degree.

Discussion.—While the French school (Babinski (1), Thomas (12)) in particular regards asynergia as the fundamental symptom in cerebellar disease, and dysmetria, tremor, adiadochokinesis, etc., as some of its special symptomatic manifestations, certain other authorities (Oppenheim (8), Lewandowsky (5)) cling to the older term ataxia and include under it all movements which are executed without measure in time or space. Characteristic of this asynergia or ataxia is the fact that it appears only during active movements. It may be tested for in a variety of ways— by the well-known finger-to-nose test, the finger-to-finger test, the heel-to-shin test and so on.

In the present report no effort has been made to differentiate between ataxia and its several constituents, with one exception—

diadochokinesis. Though it is recognized that adiadochokinesis is essentially due to inability to carry out fine motor associations of an antagonistic kind, its popularity as a sign of cerebellar disease has led to a separate consideration. In our experience the recognition of ataxia in a patient has had more significance than the detection of a tremor or the measurement of dysmetria.

It is generally recognized that the character of the ataxia present with intracerebellar lesions cannot be differentiated from that occurring in cerebellopontine cases. Stewart and Holmes find that it is especially obscure when the picture has become complicated with hydrocephalus.

Mills (6) believes that while a lesion circumscribed to the outer part of one lateral lobe may not give rise to any ataxia—at least of any diagnostic value—a lesion involving the vermis usually produces incoördination of this nature. With Bruns (3), Oppenheim (8), and others, Stewart and Holmes (11) state that it is more marked on the side of the lesion, or on the side of the hemisphere most involved.

The results from the present study indicate that occasionally ataxia may be absent both in cases with lesions occupying central or lateral positions within the cerebellum, and in those with tumors lying external to this structure. Furthermore, they show that while it may be equally marked on the two sides in certain patients with unilateral lesions,—in a few instances, even, more marked on the opposite side,—in the majority of the cases there is more ataxia on the side homolateral to the disease. When present in different amounts on the two sides, then, ataxia has an appreciable worth as a localizing sign.

ADIADOCHOKINESIS

Tumors Within One Hemisphere.—There was normal diadochokinesis in two patients. On a second admission one year later one of these exhibited a definite reduction of his former efficiency, homolateral to the lesion. Adiadochokinesis was present in twelve cases. In three it appeared equally bad on the two sides and in nine more marked on the side containing the newgrowth. Two in this group of eight displayed the same disability on subsequent admissions, one after seven months and another after two years.

Tumors Involving the Vermis.—Two patients exhibited no

adiadochokinesis in either limb. In a third it was present, but to an equal extent on the two sides. A unilateral adiadochokinesis was noted in the remaining four cases of the group. In two of these the tumors encroached more upon one of the hemispheres than upon the other. In both instances the poorest coördination was found on the side most seriously involved.

Tumors in the Cerebellopontine Angle.—Of twelve cases with lateral recess tumors four exhibited normal synergic movements. Adiadochokinesis was noted homolateral to the lesion in six. On a subsequent admission in two of these the same condition prevailed. Finally in two instances the coördination was less good on the contralateral side. It should be mentioned that in one of the latter a slight pyramidal tract weakness was present on the involved side; this may have been responsible for the difference in the arms.

Discussion.—The loss or impairment of the ability to execute simple, rapidly repeated movements as seen, for example, in the rapid, alternate pronation and supination of the hand was formerly thought to be characteristic of cerebellar disease. Oppenheim, Stewart and Holmes, and others have since shown, however, that while in typical cases it is very characteristic, it is not pathognomonic of cerebellar lesions (it occurs, for example, in the milder forms of hemiplegia—crossed), and it is not constantly present in either extra- or intracerebellar tumors. In Redlich's (9) experience it is more often absent than present.

Regarding its localizing value in unilateral disease, Babinski (2), Lewandowsky (5), and others believe that it corresponds to the side of the tumor.

In judging this test it is of course necessary to consider the various factors which may modify the response of the patient, such as the right or left handedness, the natural dexterity, the strength of the subject, etc. When adiadochokinesis is present the asynergic character of the disturbance is readily seen in the excessive movements of the affected limb. Frequently the movements are abnormally slow as well.

The results from the clinical investigation reported here again indicate that adiadochokinesis is frequently absent in cerebellar disease. When it is present in one limb or to an unequal degree in both, however, they show that it bears a fairly con-

sistent relation to the side of the lesion. Under these circumstances adiadochokinesis has some real importance as a localizing sign.

Additional Observations

It was our impression at the outset of this work that some relationship existed between the degree of intracranial tension and the response to the tests under discussion; also that the duration of the illness, from the onset of the first symptom to the time of the examination, had a definite influence upon the character of the signs. With the first of these queries in mind an approximate estimation of the pressure was made in each case, using both the elevation of the nerve head on ophthalmoscopic inspection and the degree of tension at operation. These figures were then compared with the responses of the patient to each of the tests in turn. In a similar way the second question was investigated.

The results from both inquiries, however, proved to be disappointing. The only suggestive feature was that frequently there was some temporary improvement in the symptoms following a simple suboccipital decompression.

Summary

The object of this paper has been to determine more accurately the significance of staggering gait, limb ataxia, the Romberg test, and ad'adochokinesis in localizing newgrowths in the posterior fossa. It is based upon an analysis of the records of forty-six cases of cerebellar tumor. In each instance the lesion has been localized either at operation or at autopsy. The following conclusions have resulted from the study.

1. While the staggering or drunken gait is probably the most characteristic symptom of cerebellar disease, a deviation in one or another direction has no appreciable localizing significance.

2. While the Romberg test is useful in establishing a diagnosis of subtentorial tumor, a swaying toward one or the other side has no importance in localizing the newgrowth.

3. In the majority of patients with unilateral disease there is more ataxia in the limbs homolateral to the tumor. When present in different amounts on the two sides, ataxia has an appreciable worth as a localizing sign.

4. When adiadochokinesis is present in one limb, or in opposite limbs to an unequal degree, it assumes some importance as a localizing sign.

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THE PARALYTIC AND OTHER PERSISTENT SEQUELAE OF MIGRAINE

By J. Ramsay Hunt, M.D.

A consideration of the paralytic complications of migraine. I. Migraine with ophthalmoplegia. II. The so-called Facioplegic Migraine. III. Migraine with hemianopsia, hemiplegia, hemianesthesia. IV. Optic nerve complications of migraine. Reports of cases.

Dr. Joseph Collins, New York, said there was one feature of these cases that Dr. Hunt had not mentioned, which he considered to be of very great importance, and that is the syphilitic feature. In a series of 100 cases of syphilitic disorder of the nervous system coming in succession he found two cases of typical migraine, one of them associated with ophthalmoplegia not of the severity of the first case that Dr. Hunt reported and fortunately with a different termination, in which the evidence of a syphilitic origin was found in the blood and in the cerebrospinal fluid. Migraine, showing itself for the first time in adult life, may be the manifestation of syphilis of the blood or of the meninges. The first case, the one to which Dr. Collins particularly referred, was that of a lady of distinctive social position, who came here to consult an oculist because of a beginning glaucoma. She had had migraine for many years and although there was nothing in her physical examination, no somatic evidences of syphilis whatsoever, there was something in her early history soon after matrimony which suggested the possibility of infection. Laboratory examination revealed it. She made a complete recovery, after three years of practically continuous treatment with salvarsan and mercury. Therefore, Dr. Collins repeats, that in all the cases similar to those which Dr. Hunt reported it behooves us, if we would search the matter completely and successfully, not to neglect the serologic examination of them, even though there is no history nor somatic evidence of syphilis.

Dr. L. F. Barker, Baltimore, said he could confirm Dr. Hunt's observations of the occurrence of hemianopsia with migraine. He had, himself, met with two cases, one in a lady in middle life, the other in a physician. In both of these instances, the homonymous hemianopsia was temporary,

though complete at the time. In view of what Dr. Hunt has said, it is possible that a permanent hemianopsia may develop later. Dr. Barker has made it a routine practice to have serological examinations made in all neurologic and medical cases. In neither of the two cases mentioned, however, was a positive Wassermann present, and in his own experience, syphilis and migraine are not related to one another, though it is true that migraine and lues do occasionally coexist. He has wondered as to the nature of the temporary hemianopsia in migraine and thought of a spasm of the occipital artery of Duret which supplies the occipital cortex around the calcarine fissure. The temporary loss of function in the occipital lobe on one side, due to such a vascular crisis, might later become permanent, if, as we have reason to believe, vascular crises are commonest in vessels that are beginning to undergo arteriosclerotic change.

Dr. William G. Spiller said that some years ago Dr. de Schweinitz sent him a patient who had had several attacks of transitory ophthalmoplegia. He had had migraine during many years and his parents had had migraine. In one attack seen by Dr. de Schweinitz the ophthalmoplegia developed in the morning. When Dr. de Schweinitz saw him he had a paralysis of two of the ocular muscles. Dr. Spiller saw him at 1 o'clock of that same day and the ophthalmoplegia had entirely disappeared. The man died two or three years later of an apoplectic stroke. This transitory ophthalmoplegia of a few hours' duration in migraine is a very rare occurrence and probably is vascular in origin.

Dr. Spiller said he had seen three cases of hemianopsia with migraine, one case was with Dr. Posey and Dr. Frazier; another case was seen about fifteen years ago with Dr. de Schweinitz. Hemianopsia may be merely an associated condition with migraine or may occur with few symptoms. Dr. Spiller said he had studied a case during six or eight years with Dr. Zentmayer. A young man developed convulsions and was then found to have a persistent hemianopsia. The convulsions have not been repeated more than two or three times. He is entirely well at present, except that he still has lateral homonymous hemianopsia. A fall in childhood may have caused this partial blindness which may not have been detected for several years. Hemianopsia may escape detection a long time. Dr. Spiller recalled a case mentioned to him by Frankl-Hochwart, in which the hemianopsia was discovered by the fact that a hospital patient habitually ate only half of the food on his plate.

Dr. Alfred Gordon, of Philadelphia, said that Dr. Hunt referred exclusively to permanent hemiplegias. He was anxious to hear from him as to the explanation of those temporary conditions which are most frequent. Several years ago he had a physician under his charge for periodic attacks of migraine. That man comes from a migrainic family. He was about 40 at that time and from the age of 20 he has had periodic attacks of migraine. In one of those attacks Dr. Gordon found him hemiplegic on the right side with astereognosis on the same side; he also presented motor aphasia. All the symptoms were not marked, but they were sufficiently pronounced for observation. There had been an increased reflex on the right but no toe phenomenon. The physician told him that preceding the attack he vomited. The eyes were examined and found negative. Dr. Gordon doubted the organic nature of the hemiplegia. The patient made a complete recovery and is well up to the present time. What was the condition in this man's brain? Dr. Barker anticipated exactly what he wanted to say. Dr. Gordon said he believed in a spasmodic

contraction of the cerebral blood vessels. In this particular case he did not think one could explain the condition otherwise. The patient still has attacks of migraine off and on, but there is no more involvement of the right side. These temporary conditions that Dr. Hunt has not spoken of he believed could be explained on the basis of spasmodic contraction of the blood vessels.

Dr. Philip Coombs Knapp, Boston, said there was one form of involvement of the cranial nerves which Dr. Hunt had not spoken of, namely, the anesthesias occurring in the distribution of the fifth nerve in connection with attacks of migraine. In regard to the ophthalmoplegic migraines there are a few interesting points to which Dr. Hunt had not referred. In the great majority of them the ophthalmoplegia is an incidental occurrence. The patient has had a good many attacks of migraine before the attack of ophthalmoplegia occurs and after the ophthalmoplegia has occurred he has a good many attacks of migraine without the recurrence of the ophthalmoplegia. In a very few instances there is a fairly regular occurrence of the transitory ophthalmoplegia with each attack of the migraine, but another thing must be borne in mind that even in these cases of ophthalmoplegia of short duration as time goes on the ophthalmoplegia becomes more and more permanent. The first case of ophthalmoplegia that Dr. Knapp saw was of that nature. This occurred in a young girl about fifteen years of age. Her first attacks of ophthalmoplegia were of short duration, occurring with the attack of migraine, then the ophthalmoplegia did not clear up wholly with the recovery from the attack of migraine, but remained partial. That has been found in a considerable number of the cases,—a gradual persistence of the ophthalmoplegia until it becomes permanent ophthalmoplegia independent of the migraine. The vascular element in the causation of the ophthalmoplegia is of course very clear. At the same time it must be borne in mind that in the autopsies of ophthalmoplegic migraine, to which also Dr. Hunt has not referred, the lesion has not been of a vascular character. There has been either a meningitic disturbance or a tumor in the neighborhood of the third nerve, with the natural possibility that the vascular changes occurring about that spot of meningitis or that tumor have caused a swelling or a temporary impairment of function of the third nerve. In regard to the hemianopsia associated with migraine Dr. Knapp had seen two cases. One of them was a young woman before the degenerative period of life, about thirty, and the second one was in a young girl of 18 or 20. It seemed probable that there had been a hemorrhagic lesion associated with the vascular change of the migraine. Both of the cases have been permanent. One of them he saw a year or two ago, some ten years after the attack of hemianopsia, coming on with the migraine and the second one has continued now some seven or eight years. Under ordinary circumstances, considering the frequency of migraine, it is surprising that permanent hemiplegia should not oftener come on with the attack of migraine. It is, however, very rare.

Dr. N. E. Brill, New York, stated that many of these cases of migraine accompanied by transitory hemiplegia admitted of only hypothetical explanation and that the ascertained pathological facts were practically nil; that in these cases no definite knowledge was available. He reported the case of a nurse at the Mount Sinai Training School for Nurses, aged 26, who gave no history of any of the etiologic causes for cardiac disease, and whose heart was perfectly normal, who suffered with periodical attacks of

migraine. The attacks, however, were not very frequent. In the last attack, which occurred only about three weeks ago, she had a scintillating scotoma and rapidly developed a hemiplegia which affected the right arm and leg without any accompanying aphasia and without any demonstrable sensory disturbances. The whole attack lasted only three days, when all the paralytic phenomena entirely disappeared. Dr. B. Sachs would no doubt remember the patient, as he saw her with Dr. Brill the day after his observation, and even at that time the symptoms of hemiplegia were disappearing. They came independently to the same conclusion, that there was in all probability no organic disturbance of the cerebrum and no pathological vascular disturbance in the cerebral vessels such as an endarteritis with thrombosis and that there was no cerebral hemorrhage or embolism of any of the cerebral vessels; that the most likely explanation of the attack was that it was induced by a toxemia. In this conclusion they were dealing only with a hypothesis which they thought satisfied their own minds, but which could not be proven. The nurse recovered very rapidly so that she resumed her service in five days after the beginning of the attack. She has had another attack of migraine since, but not accompanied with any signs of a hemiplegia.

Dr. Hunt, in closing, said that in regard to the pathology of transient attacks and of transient attacks which become permanent, he regarded both as having the same etiology and dependent upon a vascular spasm. When the complication persists it means that structural vascular changes have taken place; thrombosis or hemorrhage. Dr. Collins's suggestion of the possibility of lues in migraine is of course a very important one. Dr. Hunt would broaden it and say it is very important to exclude any symptomatic migraine of organic origin. As far as possible he has done that with his cases and regarded them all as cases of essential or idiopathic migraine. In regard to the trigeminal symptoms, he said it was impossible for him to touch on all the points in his paper as the time was short. Pain in the trigeminal area and hypesthesia in this area have been noted, but he was not aware that trigeminal paralysis in migraine had been described. In regard to Dr. Barker's cases and suggestions it seemed to him that in a case where hemianopsia occurs with migraine in the middle period of life and it had not appeared previously, that it is an ominous symptom and should be regarded as a possible forerunner of the final closure of the vessel in an attack and on this point he would like to lay particular stress, viz., the relation of the migraine to possible organic occlusions of vessels in the middle period of life. He thought the reason it did not occur more frequently was that attacks of migraine so often cease after the climacteric. Sometimes, however, these attacks recur in later life.

REPORT OF A CASE OF PITUITARY TUMOR WITH EXHIBITION OF PATIENT. RELIEF OF SYMPTOMS FOLLOWING CALLOSAL PUNCTURE

By William M. Leszynsky, M.D.

The patient was a boy eighteen years of age. At his twelfth year he began to increase in weight until he now weighs 152 pounds, his height being four feet nine inches. He has since complained of frequent severe headache, occasional vertigo and vomiting, failing vision and stumbling

gait. There is pronounced adiposity, dry skin, absence of hair in the axillæ and over the pubis, undeveloped external genitals, and tapering hands of infantile type. All of his movements are slow. He yawns frequently and then falls into a deep sleep unless aroused. Retarded mental development corresponding with the Binet scale for the twelfth year. The X-ray picture shows erosion of the anterior clinoid process and calcareous changes in the floor of the sella turcica which is not enlarged. In the right eye the vision is diminished to perception of light, the left equals 20 100 with contracted fields for form and colors. Bilateral primary optic atrophy. Exaggerated knee jerks, ankle clonus and Babinski plantar reflex. Blood, cerebrospinal fluid and urine, negative. Increased carbohydrate tolerance. The intracranial pressure symptoms were attributed to internal hydrocephalus. The visual disturbance was assumed to be the result of pressure upon the optic nerves either from a distended third ventricle or from a hypophyseal tumor. The corpus callosum was punctured in order to establish permanent subdural drainage.

Ten days later all of the symptoms of intraventricular pressure had disappeared. He had since remained in good health, and one year later, after his discharge from the hospital, the vision had improved to shadows at three feet with the right eye, and 20 40 with normal fields in the left eye.

Dr. E. B. Angell, Rochester, said he was sorry that Drs. Cushing and Frazier were not present to take part in the discussion. Dr. Angell said he had had two of these cases the past winter and was really somewhat in doubt as to what to do with them. He saw Dr. Cushing perform one of his transsphenoidal operations and Dr. Angell made up his mind that it was paying a big price for getting a little improvement. If this treatment adopted by Dr. Leszynsky is satisfactory it will certainly be a great gain. In Dr. Angell's case there was at first increase of the secretion of the pituitary gland, as there was a marked increase in the weight of the patient. Later there was a degenerative change, with manifestation of hypo- or dispituitarism. He thought that the operation of tapping the corpus callosum might be of service in one of his cases; that of a tailor, who does not need to know very much to attend to his work. He is stupid and though getting better under pituitary feeding, at the same time he is not able yet to return to work and Dr. Angell hoped operative treatment might benefit him.

Dr. E. Sachs, St. Louis, said he thought it was extremely important in the study of these questions to understand the direction in which the pituitary tumor was growing. He was unable to see the details of the X-ray plate from where he sat, but he found it absolutely essential in all pituitary cases, in fact in all intracranial cases, never to pass judgment on X-ray findings unless he had a stereoscopic picture. He had examined a number of plates in which there was a closure of the sella turcica partial or complete, which had been pointed out last year in Albany. He found when they studied these cases stereoscopically that the picture was a very different one. The question comes up how to account for the internal hydrocephalus in tumors of the pituitary body which do not produce any occlusion, excepting general pressure symptoms. He felt that corpus callosal puncture in general did not offer a very effective means of relieving a hydrocephalus. The work that has been done in the last twelve months by Dr. Cushing and Dr. Frazier in Philadelphia on the question of hydrocephalus and its cause seemed to Dr. E. Sachs one that would have to be taken into consideration very carefully in the treatment of internal hydro-

cephalus. Dr. Blackfan has pointed out that before you can pass any judgment on an internal hydrocephalus you ought to make a number of tests as to whether the internal hydrocephalus was a secretory defect or an absorptive one. He showed rather conclusively that if the defect is a secretory defect mere drainage of the internal hydrocephalus is not going to be effective.

Dr. W. G. Spiller, Philadelphia, said the question which Dr. E. Sachs had brought up was a very interesting one and he had recently a case in consultation with Dr. Carpenter, Dr. Frazier and Dr. de Schweinitz where it had been considered. It is difficult to determine whether hydrocephalus is caused by a pituitary tumor or the pituitary symptoms caused by hydrocephalus when both exist. If the tumor fills the third ventricle and occludes the foramen of Monro it may produce hydrocephalus, but the hydrocephalus may be primary and by pressure on the pituitary body give the symptoms of pituitary tumor. In the case Dr. Spiller referred to, in a child, marked symptoms of pituitary disorder, as increased sugar tolerance and adiposity and ocular symptoms, had caused them at first to consider sellar decompression. Callosal puncture by Dr. Frazier caused much improvement in the ocular condition. Dr. Spiller said he recently had with Dr. T. Branson and Dr. Edward Martin a case of congenital hydrocephalus in a baby. Callosal puncture had been of much benefit. He has had for several months under his care a woman approximately 30, who has marked muscular dystrophy of the Landouzy-Dejerine type and yet she has symptoms suggesting pituitary disorder. She has never menstruated, but she has not increase of sugar tolerance as determined by Dr. Alonzo Taylor. Is this merely an association of two disorders or is there some relation between glandular disorder and muscular dystrophy? He had considered in his paper read at the meeting of the International Medical Congress the possibility of the relationship of muscular dystrophy to disorder of the ductless glands.

Dr. Joseph Collins, New York, said he had two patients quite similar to the one reported by Dr. Leszynsky in the hospital during the past year in which puncture of the corpus callosum had been done without effect. He has now a patient of 29, with advanced dystrophy, of pelvic girdle type, who presents distinct evidences of pituitary disorder that may be considered almost a parallel case to the one Dr. Spiller has cited. She started with the typical symptoms of Graves' disease, then developed symptoms of hypopituitarism which continue until the present time and she has now the classical variety of dystrophy of the pelvic girdle type.

Dr. Alfred Gordon, Philadelphia, asked Dr. Leszynsky whether the boy he presented at any time showed loss of sense of smell. In a case reported by Dr. Gordon, with autopsy, in the Journal of Amer. Med. Assn., a large tumor was found at the base of the pituitary body and the loss of smell was one of the most conspicuous symptoms during the entire course of the disease.

Dr. Leszynsky, in closing, said there was an incomplete bilateral anosmia present in this case. Whether it could be ascribed to any disease of the pituitary gland he did not know. In addition to the symptoms of involvement of the pituitary gland, whether primary or secondary, the patient had many of the symptoms of intraventricular pressure. The question arose as to what could be done to relieve the urgent pressure symptoms, therefore Dr. Leszynsky had the corpus callosum punctured, for the purpose of establishing permanent subdural drainage.

HORMONE THERAPY IN SO-CALLED NERVOUS DISEASES

By Joseph Collins, M.D., and Henry K. Marks, M.D.

The problem of the disturbances of internal secretions in their rela-
tionship to so-called nervous diseases is considered. A brief survey of
the hormones is given. The thesis is then developed that a large group
of symptoms which pass ordinarily under the diagnosis of neurasthenia,
hysteria and allied conditions are in reality clinical examples of disorders
of these secretions.

Certain cases, formes frustes, so to speak of well defined clinical
types—acromegaly, dystrophia adiposo-genitalis, myxedema, exophthalmic
goiter, etc., betray themselves through partial or attenuated syndromes,
and as such offer relatively small obstacle to diagnosis. In other cases,
however, a single physical sign may be the only somatic clue. In illustra-
tion, wide glabella, spaced teeth, decay of the lateral incisors, large hands
and feet, obesity, hypogenitalia, should direct suspicion to a possible dis-
turbance of pituitary function. We are not only justified but forced to
consider what apparently represents most extraneous data if we wish to
arrive at even an approximate correct interpretation. To justify the main
contentions, the discussion is followed by the report of the number of
cases together with their therapeutic results.

Dr. L. F. Barker, Baltimore, said that Dr. Collins had brought before
the association one of the most interesting subjects in medicine at the
present time, namely, the relation of disorders of the nervous system to
disorders of metabolism and especially to disorders of function of the
endocrine glands. Clinicians are now able to recognize definite syndromes
which correspond to over-function of the endocrine glands, on the one
hand and to under-function on the other. This is true of the thyroid,
the thymus, the pituitary, the chromaffin system and the gonads. Certain
of these syndromes are very characteristic. Dr. Barker said he was very
glad that Dr. Collins had emphasized the great difficulties connected with
the study of disorders of the glands of internal secretion because he
thought there was much that was erroneous in the minds of the physicians
at present, especially as regards their recognition. It is important, he
believed, that every man who tries to use hormone therapy, or to make
diagnoses of diseases of the hormone-producing glands should familiarize
himself first with the typical syndromes concerning the nature of which
there is already a fair agreement of opinion. In other words, a man must
know acromegaly and dystrophia adiposogenitalis thoroughly before he
speculates about more obscure pituitary processes. The characteristic
pictures of Graves' disease on the one hand and of Gall's disease on the
other should influence all his thinking on disturbances of thyroid func-
tions. He should know the signs of thymus hyperplasia in a child. He
should know his Addison's disease well; he should be acquainted with the
relations of tetany to parathyroid insufficiency; and he should be familiar
with the signs that occur in eunuchs and in eunuchoids on one side, and
with those of hypertrichosis and hypervirilisms on the other, before he
goes into the more debatable syndromes believed to depend upon dis-
turbance of the secretions of the testicles and the ovaries. If he be
familiar with these typical cases,—the outspoken cases concerning which
there would be unanimity of opinion in the minds of skilled men—then
he may legitimately begin to speculate a little in regard to the atypical

cases so often met with in practice, and, if he care to, to experiment with hormones in the treatment of these cases. There is unfortunately a great deal of experimentation that is haphazard and Dr. Barker thought anyone of us may easily deceive himself in regard to the results of therapy by the administration of hormones. In the treatment of " run down " people, many of whom present disturbances of function of the endocrine glands, we often obtain good results without the use of hormone-therapy. Take the neurasthenic and psychasthenic states, and especially the grossly under-fed. Physicians resort in treatment to all sorts of medication, but if they are emaciated and we are wise we try to build them up generally. We think of the individual as a whole. Many of them get well after a while if we feed them liberally, make them rest, encourage them, and keep them away from a disturbing environment. Moreover, many patients who have been ill for months or years—especially mild manic-depressive patients— are about ready to get well, for time is, according to our present knowl-edge, an essential element in recovery; they change under our hands and we get the credit, where, as a matter of fact, any one who happened to be treating them for it at the right time and by almost any innocuous method, would get that credit. We may have given them " hormones," after which they get better; that is not sufficient evidence that the hor-mones have been of any benefit whatever!

In regard to the use of thyroid extract, good effects, he believes, will follow its administration within a very few days or not at all. Its action is speedy. Constipation, coldness of the extremities and drowsiness usually disappear quickly when thyroid extract is indicated and administered. The patient, after two or three days of treatment, will, if he has really needed thyroid, tell you that there is a marked change in his whole feeling. It is not necessary to give large doses, as a rule, in such cases; even $1\frac{1}{2}$ grains three or four times a day may suffice, though in outspoken myxe-dema the larger dose of 5 grains or more will be required. Dr. Barker has had no experience with the very small doses Dr. Collins has re-ferred to.

We should be very careful in interpreting our results after the administration of hormones. As yet, thyroid extract, epinephrin, and, to a less degree, pituitary extract have attained to practical importance in therapy. Lutein may also have a place. But by far the majority of prepa-rations thus far recommended have yet to have their usefulness proven, at any rate if administered by mouth.

Dr. Bernard Sachs, New York, said he thought we could all subscribe to a great deal of what Dr. Collins had told us in a rather interesting fashion and what Dr. Barker had now added thereto. If we sum up all that we have gotten from the presentation of the subject so far it seemed to lead up to this, that after all we are examining our patients much more carefully than we did years ago and that the attention of every neurologist and probably of every general practitioner has been called to the symptoms that are directly attributable to deficient action of the various ductless glands of the body. He is opposed, however, to the idea that the states which we formerly considered as neurasthenic or psychasthenic states must be due necessarily to disturbed function of the ductless glands. The point he wished to make was that we must have in addition to the ordi-nary nervous manifestations symptoms that we know are connected with disturbed function before we begin to prescribe hormones. He does not endorse the idea that in a mysterious case of neurasthenia or psychasthenia

it would be well to run the entire gamut of hormones in order to determine which would be beneficial. If that is the principle of therapy Dr. B. Sachs would be resolutely opposed to it. He thought we should examine in any case for the disturbed function of the ductless glands and make up our minds to prescribe for that function only if the patient definitely presents symptoms of disturbed function. That principle he hoped all would agree to. The next point he would like to bring up is what Dr. Collins did not refer to in the reading of his paper, but he may have omitted it. Dr. Collins here refers to epilepsy as a disease which he supposes is due to disturbed function in some one of the ductless glands. In regard to epilepsy, Dr. Sachs has given close attention to the function of the ductless glands and has not seen a single case of epilepsy which he could prove was due to disturbed function of the ductless glands. If anyone has definite experience on that point he thought it would be extremely important to have it presented.

Dr. Morton Prince, Boston, considered the paper by Dr. Collins a most timely contribution to one of the most important subjects which has been brought before the Association for a long time. There is one aspect of these cases which he expected Dr. Collins to speak about and he was surprised that he did not do so: that is the question as to whether the ductless gland disturbances in " neurasthenic " cases, assuming they exist, are primary or secondary. We have had a great deal of light thrown upon this subject by the very remarkable experiments of Cannon. These have supplemented the experiments of Pawlow and the St. Petersburg school on the digestive functions. With all these experiments and what they teach we all are of course familiar. They show that we get very marked disturbances of the ductless glands, particularly the adrenal, and also of the gastric and other visceral functions as a result of emotional discharge through the autonomic nervous system. The discharge may stimulate some functions and inhibit others. In other words Cannon has shown that under the influence of emotion there is an increase of adrenal secretion producing a chain of secondary changes in other organs—for instance in the functioning of the liver, increasing the production of sugar or glycæmia. Likewise the effect of emotional discharge on the digestive system is equally pronounced; stopping the secretion of the stomach, and stopping peristalsis, and so on.

Now, taking these so-called neurasthenic cases which Dr. Collins has reported, there is no class of cases in which emotion is so predominant a symptom. Emotion of some kind, such as anxiety, is very commonly present. Dr. Prince's experience, so far as the digestive disturbances are concerned, has gone to show, as it seemed to him, that these are generally secondary to the discharge of emotion; that is to the psychical condition. Granting that many of the symptoms in Dr. Collins's " neurasthenic " cases were due to hormones or diminution of hormones, they are open to the interpretation that the disturbances of the ductless glands are due to emotional influences and therefore secondary. This interpretation had to be considered. Of course this is not to deny the possibility of the disturbances being primary. But if they are secondary the alleged therapeutic factor is open to question.

Dr. Prince said he had speculated a good deal on the part the ductless glands might play in the syndromes of some of the psycho-neuroses. When we consider the large part that emotion plays in these affections, the way in which the ductless glands are influenced by the emotions as

biological reactions of a purposeful nature, as Cannon has argued, and the way secondary disturbances of the heart, liver, etc., are in turn induced by the products of the glands, it seems reasonable to suppose that some of the symptoms of the psychoneuroses may be due to hormones.

Likewise as a related problem he had speculated as to whether the ductless glands might not possibly play a similar part in some cases of asthma. It is a growing belief that asthma can be explained on the principle of anaphylaxis. Nevertheless it has been long recognized that the psychical element plays a large part in asthma. In many cases it is easy to recognize that the asthmatic attack is excited by a psychical cause. The difficulty is in reconciling these two factors.

Now it is a plausible hypothesis that the anaphylactic attack (asthma) may be induced by the discharge of hormones from one or more of the ductless glands and that this discharge of hormones is induced by the psychical factor—an emotional discharge. By some such hypothesis the organic and the psychical etiology can be reconciled.

At any rate, whatever part hormones may play in the production of symptoms in "neurasthenic" and other cases, it is important to bear in mind that the part which the ductless glands play may be entirely secondary, in accordance with the psycho-physiological principles established by Cannon and his co-workers.

Dr. Smith Ely Jelliffe, New York, said that he would like to add one word to what Dr. Prince had said. Dr. Prince had called attention to psychic factors and he thought it would be worth while perhaps, just for the sake of contrast, to go to the extreme on the psychic side of the situation, and to rivet one's mental eye, as it were, at the other end of the situation. In this way the entire gamut could be envisaged and an enlargement of what Dr. Collins had said would be possible.

Dr. Collins had called attention to the disturbances of the endocrinous glands as causing the disturbances in question. His statement of the problem is purely mechanistic. This point of view argues that the chemistry of the body can change the purposes of the individual; that disturbed physico-chemical balances are capable of modifying the mental goal of society; that evolution in its spiritual aspects can be interpreted chemically. Dr. Jelliffe thought that it would be much more profitable to look at the situation from exactly the opposite point of view, *i. e.*, that the mental life of the individual and his relationships to his fellowmen was much more capable of modifying his chemism than the reverse. To illustrate this point he cited an instance of a former assistant, Dr. X. Dr. X. had been absent for some time, and on his return to the clinic Dr. Jelliffe had remarked that he hoped that he had not been ill. Dr. X. replied that he had had an acute attack of exophthalmic goiter, after which Dr. Jelliffe asked him how much money did he lose, partly in jest and partly in earnest. Dr. X. replied that he had lost all he had, and that his financial affairs had been very suddenly and seriously upset, and that following this upset within three days the acute exophthalmic goiter was at its height. Following a very satisfactory readjustment of his finances, with the hope of a much more settled monetary basis for himself and his family, the symptoms resulting from the disturbed thyroid subsided and he was apparently completely well. Dr. Jelliffe cited this instance as illustrating the influence of nutritive complexes as producing disturbed chemisms, and felt that it was a much more logical way of looking at all of the disturbances of the internal secretions than looking in the reverse

direction. He naturally presupposed that those present would understand that a large number of acute inflammations and disturbances of the endocrinous glands which were distinctly of toxic origin were not involved in his discussion. He simply spoke for the consideration of one large group and possibly the largest: those endocrinopathies of psychic origin. It was not his intention to say that all endocrinopathies were of psychic origin, but that a large number of them were, and one was more in danger of overlooking the psychic element than the mechanistic one. Many of these endocrinopathies were the result of continuous psychic traumata, disturbances in the unconscious. This subject he had hoped to bring to the attention of the members at the Albany meeting. Even in those endocrinopathies which were due to very definite diseases of the structures themselves, such as acute inflammations of the thyroids, tuberculosis of the adrenals, tumors of the hypophysis, etc., the mental symptoms could never be explained on the basis of the perverted chemism; the only real explanations of these were psychological. The mental symptoms would always require psychological interpretation. They could not be explained on an organic basis. All that the organic disturbance did was to impair the efficiency of the psychical machine. The toxines or what not threw the psyche out of balance. The chemical factor brought about a change in the physical, which in its turn forced the mal-adaptations of the psychic. To him the truth of the whole matter lay in a recognition of the fact that man, as an evolutionary product, should not be interpreted solely as a chemical mechanism, nor solely as a feeling-moving machine, nor solely as a psychical apparatus. To view him in any single light was too narrow; he is all three. But the most important factor he felt was to put the psychical or symbolic factor in the leadership; the others were followers. Purpose and desire were the captains; the endocrinous glands the servants.

Dr. Francis X. Dercum, Philadelphia, said that it had been his experience that in neurasthenia and psychasthenia sharply defined symptoms, such as can be definitely attributed to this or that gland of internal secretion, present themselves infrequently. He said that he was in accord with Dr. Barker that in cases in which such symptoms *are* present full physiological doses of the glandular extracts should be given. However, in ordinary cases of neurasthenia full feeding and rest, in other words the Weir Mitchell method, offers the most promise of success. At the same time it must be admitted that now and then patients are met with in whom these procedures fail and it is sometimes found that in such cases when the general metabolism of the body is stimulated by giving small doses of thyroid extract over long periods of time, most benefit accrues to the patient. For instance, the thyroid extract is not given for its massive physiological effect, but simply as a stimulant to the entire chain of glands of internal secretion. In given cases the same may be said of pituitrin.

Dr. Dercum cannot subscribe to the minute doses recommended by Dr. Collins, but believes that thyroid extract should be given in doses of not less than an eighth or a quarter of a grain. Dr. Dercum further stated that he did not believe that thyroid disturbances so marked in character as to present the phenomena of typical exophthalmic goiter ever arose from shock or emotional crises. We have in the great majority of cases not only heredity but the unmistakable evidences of preexisting thyroid disease. That an excess of thyroid secretion plays a rôle in some of the forms of nervousness that we meet with, there can be no doubt.

Indeed he was one of the first to employ the term "thyroid neurasthenia." In such cases there is a moderate amount of thyroid excess or thyroid intoxication, but there is not the symptom group of exophthalmic goiter. Dr. Dercum believes that on the whole the administration of thyroid extract in neurasthenia and psychasthenia is indicated only now and then and whether we use the glandular extracts or not, we should always employ physiological methods, such as rest, full feeding, massage, bathing, exercise, etc.

Dr. E. B. Angell, Rochester, N. Y., called Dr. Collins's attention to a test he has found of value. He has had a wide experience, as all the members have, in disturbances of metabolism as a cause of nervousness. Dr. Angell alluded to a test which he terms the pigment ring, which he demonstrated last year before the American Medical Association, and which replaces the white albumin line in Heller's test. Dr. Angell obtained this pigment ring in 80 per cent. of the cases he has tabulated. In his opinion it is significant of defective metabolism of the nitrogen compounds. In the ordinary cases this can be corrected by the administration of the salicylates. It is important to reduce the protein intake, which alone will result in marked alleviation of nervous symptoms.

Dr. D. I. Wolfstein, Cincinnati, felt that Dr. Collins had presented a very important paper. We all have to deal with the problems involved in the neurasthenic conditions, and we must all feel at times as he does the inadequacy of our therapeutic efforts. Dr. Wolfstein finds himself attracted to any point of view that is physical rather than psychic. It has been his experience in the acquired type of neurasthenia, certainly, that the emotional or psychic factors are secondary to the sufferings consequent upon physical conditions. The states of anxiety, of depression, of brooding are the result, in his opinion, of the strangely altered bodily state, with its fatigue, incapacity to perform tasks that were formerly done with ease and pleasure, the realization that the strength no longer is adequate.

That under such circumstances there should ensue a psychic reaction is to be anticipated. For his part he thought that the sooner an intensive study of this problem along physical lines was undertaken the sooner we should be in position to benefit many of these puzzling and obstinate cases. Many of these have their incidence at a time of life when a disturbance in the inner secretory glandular apparatus occurs, or may occur. Dr. Wolfstein commended the attempt of the essayist to meet these problems in the manner indicated, although he could not entirely approve the rather indiscriminate use of the various glandular products. Of course he admits that the indications for their use can not as yet follow the necessarily strict lines that a further study may yet develop. In a recent case of severe headache at the menstrual periods he had obtained decided benefit from the use of corpus luteum extract; but so far has not seen much result from thymus, thyroid, or pituitary except where there were stricter indications. In conclusion he stated that it was his belief that not much was to be gained in the treatment of the acquired neurasthenic syndrome along psychic lines, but that the future would show great progress if this condition were approached in the manner indicated by Dr. Collins.

Dr. Joseph Collins said he appreciated how inadequate his presentation had been, but after working at the subject for two years it seemed to him that whatever diagnostic light we have should be focused upon a large group of patients who everyone admits are not now satisfactorily interpreted. He agreed with everything that Dr. Sachs had said. Dr.

Collins did not think that he was employing the ductless glands empirically. He administers hormones to certain individuals who have definite symptoms and certain somatic conditions. What Dr. Prince said seemed to Dr. Collins very likely. The majority of disturbances in the ductless glands, the pathogenic, are secondary, originally, to psychic or physical causes. In one case the one and in the other the other. The secondary disturbance not infrequently exists long after the primary disturbance has ceased to exist and thus may seem primary. In every case of nervous disease there is a dissociation of the anabolic and katabolic phenomena. It becomes the profounder the longer the disease persists and consequently disturbance of nutrition is always a conspicuous condition. In these cases the use of the hormones is frequently indicated, and they do for the individual that which massage or exercise or psychic treatment does, viz., stimulate metabolism. It is for that reason that small doses of the indicated hormone administered over a comparatively short time is sufficient to start the patient on the road to recovery. Thyroid extract is not a specific for neurasthenics whose underlying disorder is deficient metabolism any more than it is in gout, but it is an extremely useful substance in many cases. Epilepsy is a condition of the individual. Epilepsy is not a disease. No one, he ventured to say, was searching to-day for the cause of epilepsy in some structure or lesion of the brain, such as we did twenty years ago. A man is born epileptic the same as an infirm temper, or lack of inhibition in other directions. Epileptic manifestations later in life in many instances at least stand in relation to disorder of certain functions of the body, anabolic or katabolic. These are due largely to perversions of function of the ductless glands. Dr. Collins said he had cases of epilepsy in which the manifestations seemed to have ceased, although the neurosis has not been cured, by the administration of the thyroid. If any great advance in the treatment of disease by hormones is to be made studies must be made upon patients early in the career of their disease. That is the important thing. Very little can be done in the way of hormone therapy if you come to the case after structural change has followed functional disturbance; especially after functional disturbance has been of such a nature as to produce within the organism substances which cause the decay of the tissues. Finally, it requires great courage and temerity to present this subject before an audience of neurologists because it must be presented in such an unconvincing way, viz., by the narration of cases. Such cases must, however, be recorded. When we have a great number of them some master mind, possibly a superman, may come along and analyze them, then we shall be in a position to say with precision when to give hormones. Until then they must be given in a measure at least empirically.

(To be continued)

CHICAGO NEUROLOGICAL SOCIETY

January 21, 1915

The President, Dr. Douglas Singer, in the Chair

DISTURBANCES OF THE CENTRAL NERVOUS SYSTEM ACCOMPANYING PERNICIOUS ANEMIA. REPORT OF TWO CASES

By Arthur W. Rogers, M.D.

The speaker said we have witnessed a developmental process regarding the symptom complex of this disease, and a new group of symptoms of nervous origin has so greatly arrested our attention as to cause us practically to reform our ideas of its pathology. Cabot, in describing pernicious anemia, remarks: " Is pernicious anemia best called a disease of the blood?" So prominent are the manifestations and results of anemia in most cases of the disease that we are apt to assume that it is only the blood that is diseased. But the following facts suggest that the poison which decimates the erythrocytes exerts its influence on other organs simultaneously.

" 1. In some cases the spinal cord shows evidence of disease earlier and more markedly than the blood.

" 2. The fatty metamorphosis of the heart, liver and kidneys is not to be explained as the result of anemia. It is much more likely that the anemia, the spinal cord lesions and the fatty changes are coördinate manifestations of the same unknown poisons.

" 3. The general symptoms—weakness, dyspnea, etc.—do not always get better as the blood improves, nor worse as the blood deteriorates. In other words, they are not due solely to the anemia. There is no doubt that the number of cases of pernicious anemia showing one or more lesions of the brain or cord is much larger than the statistics suggest. Those who have written upon this phase of the subject find spinal symptoms in a large proportion of all cases, a finding, which, judging by the post-mortem results, probably represents the truth."

In pernicious anemia the entire cerebrospinal axis may be involved.

In the majority of all cases of pernicious anemia we have no symptoms that could possibly be referred to spinal disease except numbness, tingling or other abnormal sensations in the hands and feet. These discomforts are present in almost every case, even in some of those which have shown post mortem no changes in the spinal cord. Hence we cannot properly attribute them to any cord disease. Aside from the paresthesias, the cases with important spinal symptoms may be divided roughly into two groups: (*a*) Those in which we have a spastic gait with increased reflexes and a greater or less degree of paralysis, and (*b*) those in which the symptoms are strongly suggestive of tabes dorsalis, the reflexes being diminished and ataxia prominent.

Sensory symptoms, with the exception of various paresthesias, are rare. Occasionally a patient has intense pain in all the extremities, but this is very exceptional.

In considering the mental symptoms, we find ourselves unable to make any classification. The manifestations of cerebral disturbance may range from mild depression to profound melancholia, from slight exhilaration to distinct mania, and the one may repeatedly alternate with the other. Toward the end, disturbances of consciousness and deep coma may appear. In a number of cases failure of the memory and lasting impairment of intelligence have been noticed. In the majority of cases reported the mental picture has been one of exaltation.

The spinal cord is much more frequently involved than the brain. Edwards estimates 84 per cent. and that few cases of pernicious anemia fail to manifest some type of varying degree of spinal cord symptoms. When slight they may entirely escape attention, and when severe may so overshadow the true condition as to greatly confuse the diagnosis.

When this disease is associated with cord or brain symptoms, many of its chief physical manifestations are lacking, and other characteristic blood changes, less pronounced, and even at times not true to the rule, appear. For instance, in neither of his cases was the reduction of hemoglobin marked, and at no time in their course were nucleated red cells to be found except in very limited numbers in one examination. Ehrlich has termed this the "aplastic" type, which is characterized by the reduced blood count and hemoglobin, and some distortion of the cells, but by an absence of cellular regeneration in the form of nucleated red cells. The recognition of this form of pernicious anemia may serve to clear the diagnosis in many obscure cases of tabes, or spastic paraplegia.

In considering mental symptoms, Cabot found "mental disturbances in 102 out of 647 cases of pernicious anemia, delirium in 44 cases; definite delusions in 14; hallucinations in 8; dementia in 9; true melancholia in 3; and mania in 3. One case remained in a public asylum for 29 years. In three markedly insane cases, the mental symptoms preceded the manifestations of anemia by several months. Presumably these mental symptoms are to be explained as a part of the general auto-intoxication rather than a result of the minute hemorrhages found in the brain post mortem."

May 6, 1911, the American Medical Journal contained an article written by Dr. Arthur J. Patek, of Milwaukee, entitled, "Family Pernicious Anemia." Of all the monographs thus far published on the subject of pernicious anemia, this is by far the most engrossing because of the number of cases reported, and, too, it is the only reliable report in medical literature describing a familial type of this disease.

The same article reported two cases of secondary anemia occurring in the same family, one of which subsequent to this report developed melancholia, which condition alone was responsible for her seeking medical advice.

Dr. Rogers said he was indebted to Dr. Patek for the use of his notes on this case prior to the time of its coming under his supervision.

The patient, a woman 36 years old, married and never pregnant, first came under observation August, 1908, suffering from distinct melancholia, with delusions of unworthiness. Her father, two brothers, one sister and a paternal uncle died of pernicious anemia. Blood examination: Reds, 3,700,000; no nucleated reds, and but little poikilocytosis; hemoglobin, 45 per cent. Until the time of her death, in March, 1914, she had five acute exacerbations, an attack of melancholia in 1908, a similar attack in 1911, in 1912 melancholia with marked ataxia and incoördination. The fourth

attack, January, 1913, showed no special spinal or mental symptoms. Fifth attack, occurring in March, 1914, showing no special mental or spinal symptoms, developed rapidly, proving fatal. The color of the skin, gums and sclera, the gastric symptoms, edema, and shortness of breath were classical of pernicious anemia. Spinal manifestations were evidenced in a highly excitable patellar reflex, ankle clonus, Romberg symptom, marked spastic rigidity of muscles of arms and legs. Aside from paresthetic sensations in feet and hands, sensation seemed to be normal. During the intermissions, to all intents and purposes, she returned to practically a normal condition. However, the deep reflexes always remained greatly exaggerated.

SECOND CASE. Widow, 46, with marked spastic paraplegia, a mental condition of great confusion, and mild dementia when first seen. Nothing in her condition suggesting pernicious anemia until nearly a week prior to her death, when edema and color of the skin suggested a blood examination. Result: reds, 2,800,000; whites, 20,0000; hemoglobin, 45 per cent.; a few gigantoblasts, a few microcytes; slight poikilocytosis, no nucleated reds. This was a classical case of the aplastic type of pernicious anemia.

Unfortunately, an autopsy could not be secured in either of these cases.

Dr. Hugh T. Patrick was very glad the essayist had presented this subject, and hoped the paper would be widely read when published, especially by general practitioners, because they need information on this subject, and also some need to have its existence called to their attention. The speaker saw a good many of these cases, but he rarely saw one in which the diagnosis had been made or even thought of. Of the many interesting phases of these cases, he wished to mention a few.

First, one of the interesting things is the geographical distribution of the disease—not referred to by the essayist. There are some places in which it is relatively frequent, and some in which it is exceedingly rare. In Paris, for instance, both pernicious anemia and combined degeneration of the cord occurring with it are almost unknown. Crouzon, a pupil of Marie, wrote a long thesis on combined affections of the spinal cord, and he had to go to London to study these cases. He was not successful in finding a single case in all the numerous hospitals of Paris. About two years ago Dr. Patrick suggested to Marie that a case seen in the ward might be one that suggested a possibility of this trouble, but Marie shook his head and said that they did not see cases of pernicious anemia in Paris. On the other hand, in London it is very frequent. Dr. Patrick thought it not quite so frequent in Germany as in the United States. Henneberg, then at the Charité in Berlin, wrote one of the first German articles on the subject and had very few cases to cite. There is no adequate explanation for this peculiar distribution.

Dr. Rogers spoke of the two types of the disease. They might be called the pyramidal tract and posterior column types. The first with exaggerated deep reflexes and spasticity; the second, with loss of the deep reflexes, in the legs especially, and ataxia. The disease generally begins with the first type. But even with marked ataxia, one may nearly always find evidence of involvement of the pyramidal tract. The Babinski is one of the most conclusive signs in these advanced cases with loss of deep reflexes where it is not always easy, even after blood examination, to make the diagnosis.

The essayist, Dr. Patrick thought, would want to correct one of his statements, namely, that the sensory symptoms are rare. The speaker

thought that perhaps he meant the subjective sensory signs. It is quite true that there is no pain—simply a sense of numbness, but objectively there is nearly always something to be found in the way of very slight tactile anesthesia even early in the disease, and not only is the patient conscious of a feeling of numbness and anesthesia, but a distinct tactile anesthesia can be discovered. On the other hand, analgesia does not occur until quite well along in the disease, which is, in a rough way, the opposite of what one finds in tabes.

Dr. Rogers, quoting Putnam, said that in some of these cases there was sclerosis of the posterior column. It is not a sclerosis. The speaker has no doubt that Putnam used that term, and in early descriptions, both by Putnam and Dana, before the rather epoch-making paper of Russell, Batten, Collier, the term sclerosis was used, but the term "subacute degeneration" was better, so it has generally been adopted.

The description of the mental symptoms of the disease interested the speaker very much. Being in institutional work, the essayist was liable to see this side of such cases, but in the speaker's experience the mental symptoms have been strikingly absent.

Another interesting feature of this disease is that the subjective sensory symptoms—the numbness and queer feeling of which these patients complain—are very apt to begin in the hands or fingers, but do not progress there. Later, the numbness begins in the toes and feet, where the condition does progress rather steadily in degree and extent, so that in some cases the numbness is very marked, accompanied by marked anesthesia, even up as high as the groins, or even the waist line. In the meantime, the numbness in the fingers has remained about in *statu quo* with exceedingly slight anesthesia. Cases in which numbness comes on and progresses in this way are almost always cases of combined degeneration of the spinal cord.

The speaker thought Dr. Rogers's comments on the blood were exceedingly apropos. The blood examination in some of these cases is very surprising. The blood changes appear to bear no constant relation whatever to the spinal cord changes. Occasionally the cord changes begin before anything can be found in the blood. Early in the disease it is not at all rare to find a simple anemia—not of the pernicious type at all, and even in a case far along the hematological picture varies. He wished to speak of a patient who when first seen was almost paraplegic. The diagnosis had been made by Russell. The speaker treated him until he died, and still has sections of the spinal cord. One of the best known laboratory men in this city made frequent examinations of the blood, and the speaker's diagnosis of pernicious anemia was supported by each of these examinations. This laboratory man was called away from the city, so another expert, also a well-known man, made the blood examination, with the following result: "I cannot say that this is pernicious anemia; I don't think it is; it is undoubtedly anemia, but there are certain factors lacking." He felt that it should be called a secondary anemia. This at once set the speaker to thinking that he might have overlooked a carcinomatosis, or something else, so a third hematologist and laboratory man was called in to decide whether it was really pernicious anemia or not. He said he could not decide. Then the first two took blood at the same time, but could not agree as to findings. So after all it was necessary to fall back on the neurological diagnosis, which was confirmed by the microscopic

examination of the cord. But that is only an illustrative case. Many others are quite as confusing when it comes to the blood picture.

The fluctuation in the case reported by Dr. Rogers was greater than any Dr. Patrick has ever seen. In these cases the prognosis is exceedingly uncertain. In one of his earlier cases, taking rather the dictum of Russell, Batten and Collier, he said the patient could not live over a year, but she lived five or six years. The whole course of the case covered a period of nine years, which was very exceptional. However, these cases do run longer than the English authors at first indicated. But they agree now that the prognosis is not quite so bad as they first supposed it to be.

Another interesting point in this connection is that in many of these cases treatment may accomplish a great deal for the anemia but not for the cord disease. The blood picture becomes very much better—the patient's color is better; they feel better—more vigorous; but the cord symptoms do not improve. That, the speaker thought, is entirely reasonable when we consider that the lesions in the cord are destructive. But the fact remains that one must not allow himself to be misled into a favorable prognosis, thinking that the cord trouble is dependent upon the anemia. In all the cases the speaker has seen (possibly several hundred), he has known of only one patient who materially improved so far as the cord symptoms were concerned. This patient got well to such a degree that he considered himself recovered, and did numerous chores around his farmhouse in Michigan; could chop wood for half an hour. Finally he went very rapidly to the bad, and died with the typical picture of cord disease and pernicious anemia.

Dr. L. Harrison Mettler said it had often occurred to him that we should be careful in making a diagnosis of this combined degenerative condition of the cord following pernicious anemia or associated with it, without an examination of the blood. We all recall that there is a great difference of opinion in regard to multiple or disseminated sclerosis. Some find it very commonly, and others very rarely. Those who find the latter disease to be very rare apparently limit themselves to the well-known classic symptoms of multiple sclerosis, such as the nystagmus, speech disturbance, tremor, and so forth; but others, who find it very frequently, are attempting to make the diagnosis of disseminated sclerosis without these well-known classical symptoms. Without examination of the blood, the speaker did not see how a careful diagnosis was possible, clinically, between some of these disseminated scleroses without the distinct Charcot symptoms, and the disease about which the members were talking. He thought that point ought to be very carefully brought out, and if there were any means of distinction, without confirmation by the blood examination, it might throw some light on this other question, of the frequency with which some men are diagnosing multiple sclerosis, calling many of them, without the classical picture, cases of multiple sclerosis, and others finding these cases so rarely, waiting for some one of the classical symptoms. And so the question arises whether some of these numerous multiple scleroses might not be included among the cases under discussion. In his experience he has found multiple sclerosis to be very rare. He has seen a number of cases, however, which, in his opinion, came under the diagnosis of anemia with combined degeneration of the cord.

Dr. Sanger Brown asked Dr. Rogers if, in the first case he described, with the frequent, more or less complete, remissions, it occurred to him

that the medication or any other therapeutic measures, were very palpably
of benefit to the patient. Did he think they accounted for the improvement?

Dr. Peter Bassoe just wanted to refer to one point, namely, the prognosis. He was impressed by hearing Dr. Patrick say that he had seen
only one case of prolonged duration. He remembered the case of a
physician who was seen by a great many of his colleagues six years ago.
This case had onset with numbness in the fingers and general weakness,
accompanied by the typical blood picture of pernicious anemia. He had
definite anesthesias and changes in the reflexes, so that there was no
question about calling it a combined degeneration. So the usual prognosis
was given. A great deal of work was done in that case, especially gastrointestinal examinations, and finally the appendix was removed. What the
reason for it was the speaker did not know, but the patient made a complete recovery, returned to practice, and during the last four or five years
has been quite well. All the subjective symptoms have disappeared.

Dr. Bassoe asked Dr. Rogers if he has found in the literature many
other instances of such remarkable family history as in the case he reports.
The speaker had heard of a case in which the father and son were both
affected, but to his knowledge such history is extremely unusual.

Dr. Rogers felt that he had failed to bear down sufficiently upon the
fact which he most wished to impress on the members, namely, the fact
that the first case he reported had such profound symptoms of a cord
lesion on four different occasions, which symptoms entirely cleared up.
This woman was distinctly paraplegic. She had a distinct paresis of
speech, and the patellar reflex was so pronounced that it threw the leg into
a convulsion, sometimes on slight tapping of the tendon. In one of these
periods she could not walk and could scarcely stand, and yet all of those
cord symptoms entirely disappeared on four different occasions, leaving
nothing suggestive of the spinal lesion aside from an exaggerated patellar
reflex, which never disappeared. Those were the characteristics of the
case that impressed the speaker, and he has never been able to satisfy
himself as to the explanation of it.

In answer to Dr. Brown, he would say no. He had tried salvarsan
in the first case, without any effect whatsoever, and he tried all of the
various remedies that have been suggested during the first time the patient
was under his observation. He thought this medication did her more harm
than good. The other times the medication consisted simply of large
doses of hydrochloric acid, rest and diet. He never felt that the medication had much bearing on the case.

Answering Dr. Bassoe, he had gone through the literature very carefully before he made the statement that Dr. Patek's paper is the only one
of any reliability, so far as any familial type of the disease is concerned.
Eschler, and one other writer, describe cases in which a father and son
were affected, but the discussion of these papers was such that it raised
the question as to the diagnosis.

Dr. Hugh T. Patrick said he had seen two cases in one family only
once.

Dr. Rogers asked if these cases were in the father and son, to which
Dr. Patrick replied that he did not remember, but he thought mother and
daughter.

Dr. Rogers said there are two other sisters, one a patient of his at
present, still living in this family, and they are both obsessed concerning

the development later on of this disease. There is absolutely no reason, in his opinion, for this fear. One of them has a distinct mitral lesion, but neither of them has any suggestion as to pernicious anemia or anemia of any type, and both are over fifty years of age.

HISTO-PATHOLOGICAL STUDIES IN TABES DORSALIS

By G. B. Hassin, M.D.

The author reported the results of his studies of fourteen cases of tabes, of which ten were combined with paralytic dementia, and four with various psychoses. The investigations were carried on in the anatomical laboratory of Friedrichsberg Insane Asylum in Hamburg under the guidance of Dr. A. Jacob. He used the methods of Weigert-Pal, Mallory (Alzheimer-Mann-Jacob modification), Bielschowsky and Nissl. He came to the conclusion that the essential pathological changes in paralytic dementia and tabes are those of cellular infiltration and degeneration of the nerve elements. Both these morbid phenomena are more pronounced in paralytic dementia, yet they are equally constant in tabes dorsalis, and both these diseases are practically one disease with different localization. In tabes the cellular infiltrations are, like in paralytic dementia, universal in the central nervous system, sparing the cortical tissue, and are to be found in the gray matter, white matter, anterior septum, anterior and posterior roots, and especially in the meninges, including the so-called Obersteiner-Redlich's area. In addition, there are marked hyperplastic changes in the area of Nageotte. This area shows endoneural and perineural changes in the form of mighty proliferations of granulation tissue consisting of fibroblasts as well as proliferation of capillaries and their endothelial cells. Nageotte's area was found changed in all of the fourteen cases. The degenerative changes were confined (in tabes) to the posterior roots, posterior columns and somewhat to the spinal ganglia. Weigert-Pal stain showed the usual areas of degeneration, in which Bielschowsky's stain revealed a number of preserved axones intermingled with zones in which no nerve fibers could be found whatever. Such zones deprived of nerve fibers appear in the posterior columns and somewhat less pronounced in the posterior roots in the form of spots or islands, of various shapes and sizes, which represent those fibers that were destroyed by some pathological process in the posterior roots. The same spots or islands can be also found in Mallory specimens which show a number of preserved axones, and also axones in the process of degeneration similar to that described by Dr. A. Jacob in his experimental studies on secondary degeneration. The degenerated areas in Mallory specimens reveal an enormous amount of small dots, or minute granules, filling up the gaps between the remaining nerve tissue. Both toluidin and Mallory specimens show an excessive ependyma proliferation around the central canal which is probably the cause of the increased amount of the cerebrospinal fluid in tabes dorsalis. The spinal ganglia showed some shrinking of the nerve cells, their pigmentation, vacuolization and Ramon y Cajal satellites. The peripheral prolongations of the spinal ganglia appeared normal, contrary to the central processes, *i. e.*, posterior roots, which, as mentioned above, showed the same spot-like degeneration as the posterior columns. In four cases the atrophied optici were studied, and they showed the same changes as the posterior columns: pia dura infiltrations, capil-

lary proliferations and spot-like degeneration of the marginal fibers. **Dr.**
Hassin thinks that his principal findings, especially the spot-like degenera-
tion of the posterior roots and posterior columns, can be very well ex-
plained by the changes in the area of Nageotte, where the infiltrations
and hyperplastic phenomena combined with pia changes in the area of
Obersteiner-Redlich cause constant pressure on the fibers, leading to their
gradual degeneration, which manifests itself in the form of spots and
islands. Neither the toxin theory of Strümpell, nor the cellular infiltra-
tions alone, nor the spinal ganglia changes can explain the form of degen-
eration as described by him in tabes, and he thinks that his findings cor-
roborate Nageotte's teaching of meningitic origin of this disease.

REPORT OF A CASE OF PARANOIA

By Edward F. Leonard, M.D.

This case was presented because it manifests many traits of a " pure
paranoia." The patient, a man of about seventy, was an inmate of Jack-
sonville State Hospital. He believed himself to be " the only true and
living God," and had gradually formulated a system of delusions con-
sistent with this belief. He divided the universe into a certain number
of " sounds." George Washington was the " Invisible God " and supreme
ruler of " The Council." This council had charge of the visible world
and was composed of twelve men, among them being Benjamin Franklin,
Abraham Lincoln and James A. Garfield.

The patient formed his own calendar, February being the first month.
On this calendar he wrote predictions of storms, earthquakes, and cyclones.
To these predictions he affixed his seal, and then added the names or
initials of Washington, Lincoln, Franklin and Garfield at regular intervals.
He had a single room, the walls of which were profusely covered with
these calendars and also charts, highly-colored; also large pictures of
Washington and Lincoln. A number of jars stood on the dresser; these
the patient called batteries; from the " batteries " cords were strung to all
parts of the room, much resembling a spider's web. Near the " batteries "
there was a piece of metal attached to a cord. The whole mechanism was
a crude telegrapher's instrument on which the patient claimed to receive
communications from George Washington, and receive predictions of
pending disasters or the death of some prominent person.

The patient claimed to have many " followers." On them he bestowed
a number which was supposed to serve as a protection from all harm.
Whenever he met one of his " followers " he would address him by num-
ber instead of name, and he never forgot the numbers.

In many ways this patient showed the likeness to primitive man that
is characteristic of a true paranoiac; for in his system it is easy to trace
mythology, palmistry, crude masonry, superstition and a love of the
mysterious, such as bestowing a charmed number, having his own mys-
terious flag, and his seal, and his predictions of disasters. Then, too, he
showed the usual selfishness of a paranoiac, and he would become exceed-
ingly angry if his wishes were crossed, or his comfort disturbed in any way.

He displayed sound judgment and clearness of thought (outside of
his delusions), and there was an absence of hallucinations or maniacal
symptoms. He adhered staunchly to his delusions, and all his thoughts
and actions apparently were influenced by them; for he even erased his
name from his clothes and wrote " God " on them instead.

In six years study of the case there was no noticeable change in the patient's system of delusions, nor did he display any emotional disturbance except those of anger and vexation, such as might be found in a normal man.

Dr. Douglas Singer said that he had once visited the man whose case Dr. Leonard had reported, but never examined him. The subject of paranoia is really one of considerable interest in many ways. It depends on the way in which one looks at these disorders. It seems to him that the views of most people are extremely vague as to what paranoia is. It is one of the oldest and most honored descriptions we have in the whole of our nomenclature, but to-day it is gradually losing its various strongholds. It is perfectly true that Kraepelin has attempted of late to define a paranoia which shall be separated from dementia præcox, and from a new group, described as paraphrenia, but so far as Dr. Singer can understand, his attempts at distinction between these are not convincing, especially from the type of paraphrenia. The chief point in regard to the definition, however, is that true paranoia is a condition in which the individuals are abnormal all the way through, from the beginning of their lives. In other words, it represents a progressive development from the time of birth. When one reads Kraepelin's description of the paraphrenic disorders, one finds that same feature still present, at any rate. And it is for that reason that a great many people have dropped the use of the term altogether. We tend rather to speak of them as paranoiac conditions, without attempting to say more about them. But it is perfectly true that now and again one comes across an individual of this type, in whom there seems to have been throughout life a slow, steady, building-up of a system of delusions of this kind—more or less fantastic. However, Dr. Singer would not express a very definite opinion as to whether it is a separate group.

Dr. Leonard said that the case he had reported was very interesting. The man had quite a following, so to speak, in the town near the asylum. The speaker believes that a great many forms of religions, on the order of Dowieism, are just forms of paranoia, and that if this man had been allowed his freedom he could have had a very large following. After he died a couple of patients in the asylum tried to imitate him.

CLINICAL CONFERENCE OF THE NEUROLOGICAL INSTITUTE OF NEW YORK

January 7, 1915.

Dr. J. Ramsay Hunt in the Chair

ANEURYSM OR OTHER LESION CAUSING THIRD NERVE PARALYSIS, TITUBATION AND HEMIANOPSIA

By Edwin G. Zabriskie, M.D.

The case was presented from the First Division. The patient was a widow, 45 years old. Since childhood she has had periodic headaches, migrainous in character. Menses began at 20 and still persist; had one miscarriage at five months twenty-three years ago. Her husband, mother

and two sisters died of tuberculosis. On Wednesday, December 23, 1914, she awakened with severe fronto-occipital headache. The headache was quite unlike the migraine she had had. She felt very dizzy, lay down and took some homeopathic medicine. In the afternoon she felt better and got up and worked. Suddenly a mist came before her eyes and when she attempted to walk and stand she staggered like a drunken woman, lay down, got up again, staggering worse. Lay down again and fell asleep, became unconscious and remained so for four or five hours. She said they tried to waken her but were unable to do so until 2 A. M. She had been there since 7 P. M. On first awaking she did not know where she was for a few minutes. She then tried to get up but fell sprawling to the floor; after a few minutes went upstairs, staggering worse than ever. She felt better by the afternoon; staggering was not so bad and the headaches were less severe.

Two days later the right eyelid drooped suddenly and she saw double. She had many waves of strange feelings over whole body, as though she were going to faint, the headache gradually diminished, and there was no nausea or vomiting.

Examination December 31, on admission to the hospital, showed paralysis of the right third nerve with ptosis, and inability to turn the eye upward, and limitation of movements inward and downward. The pupils, about 2½ mm. in diameter, reacted promptly to light and accommodation, slightly irregular in outline. The station and gait were decidedly unsteady, the feet being wide apart, with an inclination to fall to the left. The squeezing power was slighter of the left hand than of the right and the flexing and extending power of the left lower extremity seemed to be somewhat less than of the right. It might possibly be said that she had a slight left hemiparesis of the extremities. There were no sensory or motor disturbances of the face. The tendon jerks of the lower extremities were lively, with an exhaustible ankle clonus on the left side. The pulse varied from 60 to 120 and was very susceptible to accentuation by effort. Occasionally there was intermission of a beat. The blood pressure varied from 115 to 125 and was equal on both sides. The Wassermann reaction of the serum and the cerebrospinal fluid was negative; the latter reduced Fehling's solution, and contained 30 cells to the cubic millimeter. No abnormality of the viscera was made out. On January 4 she was examined by Dr. Ward A. Holden, ophthalmologist to the hospital, who reported, in addition to the ocular findings above mention, a slight but distinct contraction of the left halves of the visual fields for red; the optic discs were normal. The ptosis was not quite so complete as it had been. There is inability to turn the eye upward and mobility is limited inward and downward. The gait is decidedly broad based and titubating; she always falls to the left. Barany's pointing test is correctly executed with the eyes open and shut, no ataxia of the hands or legs. Deep muscular sensibility does not seem to be disturbed, knee jerks are exaggerated, left ankle clonus, no Babinski (this is possibly obscured by defense movements). Pulse 120.

We have therefore a woman subject all her life to migraine who developed suddenly paralysis of the right third cranial nerve, a slight left hemiparesis and a slight left hemianopsia and in whom these conditions persist. The question is where and what is the lesion that is producing these symptoms. The seat of the lesion must be at the base of the brain where the third nerve and the optic tract wind over the cerebral peduncle.

The lesion may be vascular, such as an aneurysm or a thrombosis, it may be a tubercle or possible luetic or may be one of those rare conditions that occur rarely with migraine, a migrainous ophthalmoplegia, and whose pathology is unknown.

The most probable diagnosis is aneurysmal dilatation of one of the posteromesial branches of the posterior cerebral artery. Such lesion best explains the symptoms and their conduct. Were the lesion in the peduncle itself the syndrome of Weber would be present, *i. e.*, alternating superior hemiplegia: complete paralysis of one side of the body, including the face and paralysis of the third nerve of the opposite side. We may be right in assuming that the weakness of our patient's left side is the expression of a slight encroachment on the peduncle by a lesion such as aneurysm, tubercle, or gumma even, and that her symptoms constitute therefore the Weber syndrome not fully developed. In view of the fact that the Wassermann reactions are negative even after the administration of what has been called a provocative dose of salvarsan (0.4 gm.) and that there are no somatic evidences of syphilis that diagnosis may be excluded. A local tuberculous deposit cannot, however, be so safely excluded. The existence of 30 lymphocytes to the cubic millimeter in the cerebrospinal fluid suggest tubercle and the patient's history of exposure to the infection must be kept in mind.

There are many reasons why the case was not believed to be an example of ophthalmoplegic migraine. In the first place, it is improbable there are any cases in the literature since Charcot first called attention to the remarkable occurrence, viz., oculo-motor palsy occurring in the course of an attack of migraine, and recurring, in which the paralytic accompaniments of the attack came on when the patient was as old as this one is. In the second place her present symptoms were not ushered in by phenomena of migraine, and in the third place the symptoms other than the third nerve symptoms, namely, the reeling, the hemiparesis, and the hemianopsia are not features of ophthalmoplegic migraine.

CONGENITAL CEREBELLAR ATAXIA

By Henry K. Marks, M.D.

The patient, from the First Division, is 5½ years old. His father is healthy. His mother for the past few months has been complaining of headache and constant dull pain in the right shoulder and arm. Her serum Wassermann has been reported positive and she is under treatment in the hospital. There is no history of hereditary or familial diseases. No consanguinity exists between the parents. A maternal aunt has paralysis agitans.

There are three other children besides the patient, all older than he. They were full-term babies and are healthy and thriving. The eldest is now 18. The mother had one miscarriage after the birth of the patient. The patient himself was a full-term 7½ pound baby. Labor was prolonged and difficult. After thirteen ineffectual hours it was discovered that he was a transverseling. Instruments were resorted to and the child was born asphyxiated. For two hours he gave no sign of breathing. Soon after he began to breathe, he was fed by spoon and swallowed naturally without regurgitation. From the time of birth till two weeks later

the child made no sound but lay as if dead. Then he began to cry, crying day and night. His cry was that of a normal child. From now on he took the breast for the first time.

To be noted in his subsequent history are the following: His first tooth appeared at the age of five months, the second at seven months. When about a year old he began to take things in his hands but his movements were weak and awkward. The mother is certain that there was at no time any disturbance of sight or hearing. The child appeared to understand but was not as smart as her other children.

What gave the parents chief concern and what now brings the child to the hospital is a so-called paralysis. Not until he was two years old was he able to sit up, and then so unsteadily that the fearful mother preferred to keep him flat. He would suddenly jerk from side to side and fall, commonly backward. At the age of two and a half years he started to creep. He began to stand when he was three and after a year or so attempted gradually to walk, but very unsteadily. He first attempted to talk at the age of three. His speech, however, was very defective. He has a vocabulary of four or five words—mamma, papa, cake, stairs; but the sounds only remotely suggest the originals. From birth he has been obstinately constipated, and his bowels have never moved spontaneously, most of the time fecal discharge has been hard, scyballous masses, the size of small marbles. For a year past he announces when he has desire to urinate. Since birth he has drooled but now he is gradually ceasing to do so.

The child has had no infectious diseases and a slow, gradual im-improvement is being noted in the disturbances enumerated.

On physical examination a child of average size for his years is found. His face is thick and heavy, his general nutrition only fair. His tonsils are hypertrophied, the submental glands palpable; diastasis of the recti exists. General examination reveals no abnormality of his internal organs nor any definite signs of congenital lues.

His right pupil is a trifle larger than the left and neither is quite circular. The reactions to light and accommodation are, however, prompt. His fundi are normal, the cranial nerves are intact.

His muscles are small but their strength is quite proportionate to their development. Gross range of movement at all the joints is normal. There is no true hypertonia, though variable voluntary spasm occurs on attempts at passive motion. As to his reflexes, his arm reflexes are not definitely obtained. No Hoffman sign exists. The epigastrics and abdominals are active and equal. His knee jerks are feeble, his ankle jerks not obtainable. Clonus and Babinski absent.

What rules the picture is a general disturbance of equilibrium, a disturbance in the exact performance of voluntary movement of all sorts. This refers not only to his body and extremities but to his eye movements and speech as well. There is no paralysis of the external eye muscles, but on forced deviation there is seen the impossibility of sustaining a given position. True nystagmus is absent but a constant bulbar unrest occurs. His speech is indistinct, scarcely intelligible. At most he makes simply approximate sounds. A general choreiform unrest is evident—a difficulty in maintaining static attitudes.

Examined more closely, a general awkwardness and insecurity are seen in his arm movements. There is no dysmetria, no asynergia in a

strict sense. Prehension is very fair. Finer movements of the hands, however, such as holding a pencil to draw or write, are grossly affected. Signs of peripheral ataxia are absent. Adiadochokinesis, however, is extreme and about equally distributed, right and left. The outstretched hands display a moderate hyperextension at the metacarpo-phalangeal joints.

In the legs with the child in dorsal decubitus this same general awkwardness of movement is evident. Well-defined dysmetria exists. In the heel-knee test the heel is thrown high up on to the thigh, then gradually slid on to the patella. Occasionally his legs perform wide, coarse, irregular movements as the knee is being attained or after. There is no asynergia, no peripheral ataxia in the conventional sense, no cerebellar catalepsy. Aside from a variable amount of choreiform unrest he sits as a rule fairly quietly. Occasionally, however, his body may suddenly swerve laterally and even cause him to fall. He stands on a moderately broad base. The choreiform unrest of his trunk and arms becomes now in general more marked than when sitting. Occasionally he will suddenly sway laterally and he seeks then to improve his equilibrium by broadening his base. Rombergism is absent. His gait is typically titubating with a marked propulsive tendency. At times this latter becomes so pronounced that he appears literally to plunge forward rather than to walk. He holds his trunk habitually over-flexed on the pelvis. In bending backward no compensatory flexion of the knees or rise on the toes occurs, but this must be accepted with reservation.

His superficial and deep sensibility as far as can be determined and his special senses are intact.

There is then a history of marked disturbance of equilibrium dating from birth, the history of a child who did not for some reason or other learn the coördination of movement, the function of sitting, standing, walking, etc., at an age when in healthy children it should normally occur, the history of a child in whom these functions were delayed but are being slowly but gradually acquired.

The child presents the picture of a cerebellar syndrome practically pure. As to the involvement of the cerebellum there can be no doubt. We have in other words to do with a case of congenital cerebellar ataxia. This point is easily settled. The mode of onset, the course of the disease, its tendency toward gradual improvement are classical and immediately rule out that large obscure group of cases under which Friedreich's disease, the hereditary cerebellar ataxia of Marie and olivo-pontocerebellar atrophy are included. The presence of a considerable mental retardation, even omitting the fact that the child has never had systematic instruction—his mental age by the way is only 2.8—does not militate against this conception. Of importance almost equal to the mode of onset and course of the disease are certain negative data—the fact that there are no signs of pyramidal involvement, that the special senses, cranial nerves and general sensibility are essentially intact.

Granting then that this is a case of congenital cerebellar ataxia, it is left to decide what is the etiological factor, what is the essential pathology. Is it to be sought in a defective development of the cerebellum and agenesis, aplasia, hypoplasia or may it perhaps be found in a secondary condition, an inflammatory process occurring in utero or some vascular accident occurring either intrauterine or during the process of birth? In other words, have we a cerebellar infantile palsy comparable to cerebro-infantile palsy due to encephalitis or hemorrhage?

Granting syphilis in the mother at time of conception, granting congenital syphilis in the child—unfortunately neither examination of his blood or spinal fluid has been done as yet—we have a favoring etiological factor for any one of these three conditions—agenesis, vascular accident or cerebellar encephalopathy. The prolonged difficult labor, the transverse position of the child, the use of instruments might well have produced hemorrhage with secondary porencephaly. Even the report of positive syphilitic findings in the spinal fluid cannot allow us to differentiate with absolute certainty. Further, whether congenital cerebellar ataxia in the strict sense of agenesis or cerebellar infantile palsy, the course of the diseases need show no particular differences.

POLYNEURITIS OR POLIOMYELITIS.

By J. L. Joughin, M.D.

This patient, from the First Division, is a bright young Jewish girl, aged 12. When very young she had measles and whooping cough. She had mumps three years ago and either two or three years ago suffered from an attack of grippe. She has never had sore throat, her health for the past few years has been excellent, and she has regularly attended school, during that period never having absented herself on account of illness.

On Wednesday, eleven weeks ago, she complained of severe pain in the calf of the right leg which occurred only on walking. This was the only symptom characterizing the onset. On Thursday the intensity of this pain diminished, but she noticed a rapid decrease of the motor power of both legs. In spite of this, however, she walked eight blocks to school and ascended four flights of stairs to gain her class room. Near the top of the fourth flight her legs gave way entirely, she fell and was unable to regain her feet without assistance. At this time she noticed that she could not get up from her chair without placing her hands on the arms of the chair and thus partially supporting the body weight while in the act of arising.

Friday she went to school in the morning but in the afternoon became unable to walk and since that time she has never been able to resume attendance at school. By Saturday all pain had left her. On Sunday the motor loss increased to complete disability when she entered the Jewish Hospital, Brooklyn, and remained there for six weeks. She says at this time she could not stand alone even momentarily, nor walk, and any movement of the toes or of the foot as a whole at the ankle joint was quite impossible. The mother of the child confirms these statements. There were not at that time nor had there ever been any paresthesias nor does she recollect that she ever felt pain on deep pressure of the muscles of the calves or thighs.

A day or two after entering the hospital she began to fumble in picking up objects and this difficulty became very marked, though it never increased to complete impotence. A definite loss of power developed in the upper extremities, the fingers became partially flexed and it was only after passing approximately two weeks in the hospital that she became able to extend them. Apparently there have been no subjective sensory

disorders in the arms. There has been nothing at any time in the history which would suggest that there has ever been any cranial nerve involvement. The sphincters have been quite intact.

Status præsens.—The patient falls when standing in the Romberg position. The gait is uncertain, rather broad-based, and of steppage type. There is a paresis of both upper and lower extremities and this is most marked in the distal portion of the limbs. Apparently the flexors are more affected than the extensors and the left side of the body more than the right, but this difference is slight. The forearms, the lower third of the thighs, and the legs below the knees are distinctly atrophic. This is apparently an atrophy en masse and not of isolated muscles. The thenar and hypothenar eminences of the hands are flattened and soft, the left more so than the right. Though the interossei do not appear atrophied, their muscular force is almost nil. All the muscles of the extremities are flabby and there is some hypotonus. There is no fibrillation. At the time of the first examination there was distinct violaceous mottling of the skin of the legs, but this is less evident now.

The special senses, speech and sphincters are unaffected. The sensory examination is negative and there is no astereognosis. The pupils and extrinsic muscles of the eyes show nothing abnormal. At the cardiac apex is heard a slight soft systolic murmur which however is not constant and is limited to this area.

The knee jerks are present, the left greater than the right. The ankle jerks could not be obtained and there is no ankle clonus. No cutaneous reflexes could be elicited. The examination of the cerebrospinal fluid revealed no abnormalities.

There is here, therefore, occurring in a child of twelve a purely motor paralysis, most marked distally, symmetrical, and of a rapid and afebrile onset. This in a few days attained its maximum intensity, began rapidly to improve and has uninterruptedly continued to do so.

The etiological factor so far as the speaker had progressed in search for it is still undetermined. The condition certainly does not coincide with any of the classical types of neuritis usually described. The development of complete paralysis within the space of four or five days and the subsequent rapid improvement, along with the absence of sensory disturbances, suggests to him a diagnosis of poliomyelitis. However, to him, at least, the marked symmetry of the atrophy, the paralysis so marked distally and the afebrile onset exclude this diagnosis. He regards this as a case of polyneuritis presenting several interesting atypical symptoms, the etiology of which is at this time in doubt.

Translations

THE DREAM PROBLEM[1]

By Dr. A. E. Maeder

ZÜRICH.

(Translated by Drs. Frank Mead Hallock and Smith Ely Jelliffe.)

The analysis showed that the fisherman symbolized the Last
Judgment, a problem which secretly occupied and worried the
youth at that time. One of the chief associations for this was
Goethe's poem " Prometheus," in which the protest against God
the Father is idealized. A blind and helpless hatred against fate
is evinced in this dream. The patient's insight was still at a
primitive phase, where all evil is deemed as coming from outside,
towards which one is powerless, but which one curses. The
reaction is not directed against his own ego as the cause of the
evil. The recognition of having failed towards himself is not yet
reached. It will take time in the ripening process to reach the
place where the patient will understand that the hatred is really
directed against himself, something within him, the archaic libido
(Jung's excellent expression) must die and be offered up, re-
nounced. When he succeeds in doing this, the Last Judgment
will have lost its troublesome character. In the time between the
two dreams related, there has evidently taken place a tremendous
inner assimilation, which expressed itself outwardly as great
progress in adjustment to realities.

In the interval he had a dream of which, as before, I will
give only a few data. A figure appeared in this dream which,
under the form of a member of the family, represented a personi-
fication of the dreamer's evil instincts, and his tendency to self-
indulgence and laziness. During a journey in an express train,

[1] A paper read at the Congress of the Psychoanalytical Society at
Munich, September, 1913.

the person spoken of left the compartment and although the train did not stop he walked towards a house, climbed to the top of the lightning rod, and then disappeared into the air. This was all the renunciation that the dreamer was capable of at the time. If my double "I," the hostile ego, can be got rid of without greatly disturbing me (the train does not need to stop) I am quite agreeable to this. The youth desires salvation by means of a sort of magic; that is, he does not himself as yet make an effort. The dream of the blue horse with the examination of the foot shows more earnestness, a deeper insight, but the power to act is still small.

From another case I shall take another series of parts of dreams, which illustrates the progressive evolution of the transference and the attitude of the dreamer to the sexual question. (We are now dealing with a girl of 28 with very marked sexual repressions.) I shall content myself with giving quite summary statements. In the night of September 3 4 the lady dreams: "A trunk has arrived; my sisters A. and M. unpack it. It contains a snake; M. shows me how I can cut off its head and take out its brains, as in a fish, but I recoil in horror." September 23 24 she dreams: "I took a shoe to a store to get the rubber heel mended. But they also put a longish piece inside the sole, which I did not wish. That should only have been done by the shoemaker who made the shoes. As it is done, however, I content myself and pay fifty centimes." October 11 12 she dreams: "A squirrel is running in the wood. At last I succeed in catching it. Like lightning, there comes to me the thought that it might bite." During the analysis of this dream I learned that this lady for some time has been interested in soft animals especially in groundworms. A few weeks before this she still expressed a most pronounced disgust of these creatures. Another dream: "I am in the house of Professor Y. I am lying in bed and he examines the build of my body, declaring that I am especially well adapted to the bearing of children."

I need hardly mention that I only explain these dreams as being useful in the development of the lady's feelings, after a penetrating analysis. So that we are not dealing here with interpretation according to a knowledge of the dream content.

I place great importance on the choice of the pictures and

expressions in the manifest dream content, since the dream renders an autosymbolic presentation of the psychological situation of the unconscious. An energetic, purposeful and well-adapted conduct in the dream, points to a mature and successful adjustment of the dreamer towards the matter in hand. For instance in a dream, there occurred the violent ejection from a church of a talkative, vain, and uncongenial traveller, whereby is pictured the serious efforts of the dreamer to overcome the characteristics of his own ego as caricatured in the travelling man. As has already been mentioned, in the first example, the different persons in the dream are personified tendencies of the dreamer himself. This idea is not new; Freud and Rank formulated it long ago. But I may be allowed to generalize it, and would like to add something. A good deal depends, in the interpretation, on the part the dreamer himself takes in the dream, which of the personifications leads in the action (the Centaur in the Prometheus myth!) for this gives us a hint in estimating the momentary evolutional phase.

I have repeatedly felt great admiration for the cleverness shown by the psyche, even of the average individual, in the production of plastic, fitting pictures for the actual situation, and I value the composition of the manifest dream content more highly than does Freud, who, in my opinion, accentuates the censor function in a one-sided manner. I see in all this a really artistic work, a real art of expression, which I would like to place in some relation to art in general. The dream is perhaps the primitive work of art.

The observation of the last months leads me to suppose that the dreams which are specially plastic and well constructed (in which Freud assumes a particularly intense secondary dream work) represent a clearly grasped and intensely felt situation. They are often significant, occur on important occasions in life, for instance, at critical junctures, or as reactions to important events. These dreams sometimes repeat themselves. In some cases they reach an extraordinary degree of transparency, so that they are already intuitively understood by the consciousness of the dreamer, and are utilized as motives for conscious actions. I am thinking of a dream which presented the classical motive of Hercules at the cross roads and always persecuted this lady when-

ever she was in any dangerous position. However, this lady was remarkable for her very rich and valuable premonitions and for her fine psychic organization.[3]

[3] My practice brought me a pretty confirmation of this last sentence just at the moment of my last revision of the manuscript, before going to print, and I would not like to deprive my readers of it.

A lady, who for the last four days has been undergoing psychoanalytic treatment (it is rather a case of orientation than of treatment), told me, spontaneously, the following dream, to which she herself attached great importance. (I wish to emphasize that I have not spoken to her one word about the value and meaning of dreams in psychic treatment.) " I am with an aunt, long since dead, in my parents' country house. I am sitting near her; another relative is present. She says to me in her amiable, lively and always decided manner: 'Get up. Go to Karl [the husband of the dreamer] and to your children. But put on your pink dress.'" The lady awoke and is very happy over her dream. Usually she pays no attention to dreams and seldom has clear or plastic dreams. She sees in this dream a clear hint of the path she should pursue. The following is the lady's psychic situation: She is 40 years old, married, mother of three children, who caused her much trouble lately (difficulties concerning their education). She loves her husband, respects him greatly, but does not stand in close rapport with him. She fears him, does not dare to assert herself. He has a remarkable mentality with a tendency to masterfulness. The lady had a very sunny childhood and youth, grew up in a large family. She left her native place when she married. Life, since then, has brought her many difficulties. She has not yet adapted herself to her new environment, she longs for her childhood's home or for death. She has passed through several periods of depression, suffers from certain phobias. A year and a half ago she heard of psychic cures, through a relative who was cured, and hoped, without talking about it, to undergo such a treatment herself. After thinking about it for a long time she at last succeeded in getting away for a few days in order to ask my advice as to what she should do. She has a deep nature, but is far from reaching the degree of psychic development possible to her. (She is already 40!) She has thought much about her situation. Her self-will tells her she ought to secure strength from the visits to the physician, in order to assert herself against her husband, but she also feels this does not promise to be a good way.

In the three interviews with me, which preceded the dream, I was able to show her her infantile and inadequate adjustment to her husband, and the relation of this to the parent constellation. She had then come to understand that her longing for death was a symbolic expression of her avoidance of her life problem—that is, to be a mature wife and a loving and decided mother of her children. She had always expected from her husband the same exaggerated recognition which all her family had given her in her youth, and is still annoyed that her husband's way is different. The day after our third interview came this dream, which told her to go to her husband and her children with the pink dress on. This dress belongs to her youth, she wore it on festive occasions. Otherwise she sits at home with tears in her eyes, now she is to put on the pink dress. She is not to go against her husband, but she is to stand in more correct relations to him than formerly; not in the infantile attitude of constantly expecting to receive, but in relation of being herself the giver (as wife and mother). What is confronting her is this after development. The aunt, we learn, was a prominent educator; the head of a large school and the only person who understood, when she was a child, how to tell her what was disagreeable to her (reproof) in such a way that the self-willed

Many historical dreams—I am thinking for instance of the dream of Cæsar's mother before his birth,—belong to this class. A short notice of certain visions of definite character may be permitted here, in which, supposedly, a still more intense working of the unconscious material has taken place, so that the meaning has come within reach of the consciousness. The celebrated visions of Benevenuto Cellini the analysis of which I gave at the International Congress of Psychotherapy last year (and which will appear in my book on the "Manner of Cure"), also belong here.

The same is true of many visions which occur in the course of religious conversion and in the "Automatismes téléologiques anti-suicides" of Flournoy.

The Dream in Its Psychic Environment

We shall now go back to the consideration of the dream, and its relation to the psychic situation, what is known in biology as the question of environment. Hitherto the dream has not been sufficiently investigated clinically and has been regarded too much as a symptom apart.

A thorough investigation from this point of view should bring a harvest of valuable material for the solution of numerous questions. For example, I consider the clinical behavior of the dreamer, after the dream, as an essential contribution to the solution of the contested question of the actual function of the dream. The mood on awakening, and all next day, may be an important indication of the success of the dream work. Hints on this point I have already given in the analysis of the dream of the

girl had to accept it, and was actually grateful to her aunt. So the aunt is a personification of a tendency to the mother image. The country house spoken of is the birthplace of the dreamer's mother and at the same time the paradise of her own childhood days. The dream urges her to leave this paradise (to overcome her mother transference), to go into her own home. Her relation to the physician is the same as to the aunt who was mentioned as being a great educator.

To one who understands the structure of the dream, this appears very transparent. The dream signifies the first decided step in the solution of the lady's task which has so long remained unsolved. It is not merely the first step in a new direction, but the link in a long chain of circumstances, which was prepared by a long elaboration entering into a specially active phase through the conversations with the relative who was cured [also a patient of mine]. This example gives another illustration of the necessity, emphasized in this article, of considering the dream in its broad relations. This question will be treated in the next part of the text.

blue horse. The so-called "nurse's dream," which will be analyzed in the second part of this part, is a clear negative example of unsuccessful dream work.

I shall now present to you a convincing example of the success of a dream, which I take from the third edition of Freud's "Traumdeutung." On page 317 a number of Rosegger's dreams are discussed, which I shall quote: "There is a class of dreams which are well entitled to be considered 'hypocritical,' and which put the theory of wish-fulfilment to a hard test. My attention was called to this when Mrs. Dr. M. Hiferding brought for discussion to the Vienna Psychoanalytical Meeting the following dream by Rosegger. Rosegger, in his Waldheimat (second volume) says in a story entitled "case A," page 303, "I usually enjoy healthy sleep but many a night I have no rest. I lead, side by side with my life as student and litterateur, the shadow life of a tailor's apprentice. This I have dragged with me through long years, like a ghost, without being able to get rid of it. It is not true that in the daytime my thoughts are frequently busy with my early past. From a Philistine I have become one who attacks heaven and earth and have other things to do. The happy go-lucky chap could hardly have thought of his nightly dreams; only later, when I became accustomed to think things out, or perhaps when the Philistine in me asserted himself again, it struck me how strange it was that when I dreamed at all I was always the tailor-apprentice, and as such had been working a long time without compensation in my master's workshop.

(To be continued.)

Periscope

PSEUDOHYPERTROPHIC MUSCULAR DYSTROPHY. J. Shaw. (Dublin Jl. of Med. Sc., Aug., 1914.)

Two cases of this disease in brothers are here reported. The family history was negative, and a third child, a girl, was healthy. One of the brothers fell out of a perambulator when a year old, but with no harmful effect. Six months later, he had inflammation of the brain. After recovery, he was weak in his legs and at the age of two years, swelling of the calves was first noticed. He has never walked properly and is always falling. The condition has become progressively worse. The other boy was normal up to four years of age and was able to walk. Then he began to waddle and fall easily. When standing, the legs were kept apart, the chest was flattened anteroposteriorly, the shoulders were thrown back, the abdomen protruded. There was lordosis in the lumbar and dorsal regions which disappeared on sitting down. The gait was slow and equilibrium was easily disturbed. Of the muscles, those of the calves were most enlarged. Others showing hypertrophy were the supraspinatus and infraspinatus, deltoid, triceps, erector spinæ, gluteus maximus, and the hamstring. The atrophic muscles were the latissimus dorsi, pectoralis major, and biceps. Loose shoulders were well marked. The extensors of the knee, also, particularly the vastus internus, were atrophic. The knee jerks and the Achilles jerk were absent. Muscular weakness was one of the most evident features of this type of muscular dystrophy, and it was obviously not due to loss of muscle sense as in tabes. The only known etiological factor is heredity. In one half of the cases, it has been found to exist in members of the same generation. The familial tendency is marked, and is often limited to one sex. The female is capable of transmitting the disease though not affected.

BRINK.

SALVARSAN AND TOXIC NEURITIS. J. Argañaraz. (Semana Medica, May 7, 1914.)

Six cases of severe optic neuritis supposed to follow the use of salvarsan were reported by the author in 1912; two were encountered in his own practice and the others were from other local physicians. He now reports a similar group of a severe toxic affection following the use of salvarsan or neosalvarsan, four in his own practice and three from the experience of other local physicians—the disturbances affecting the uveal tract and the sensory apparatus of the eye in these cases. The symptoms observed suggest a toxic action from the drug. In the cases in which the salvarsan was continued after they had developed—assuming that they were the work of spirochetes that had escaped the action of the salvarsan—the symptoms grew progressively worse as the drug was continued. One patient became blind and another suffered such intense pains that he pleaded to have his eye enucleated. The iridocyclochoroiditis became progressively worse with hemorrhages and secondary glaucoma, entailing the destruction of the eye. This fate also confronts another patient and no benefit has been derived from vigorous mercurial treatment. This young man had been

given systematic mercurial treatment at the time he contracted syphilis, in 1912, and then was given two intravenous injections of salvarsan with an eight-day interval. Twelve days later his right eye developed iritis and he was given a systematic course of mercurial treatment, with iodid, but the serous iridocyclitis continued to progress, the iris became atrophied and adherent and vision from 1/4 had dropped to mere perception of out-lines at about 7 inches. The further course in this case is not known. In one of the group previously reported the syphilis was of fourteen years' standing, and had been kept under control with mercury. Then a single injection of salvarsan was given and bilateral optic neuritis developed at once, entailing almost total blindness. In conclusion Argañaraz cites from the literature various cases of amblyopia consequent on arsenical medica-tion before salvarsan was discovered. The assumption that the eye affec-tion in his cases would not have developed if the dosage had been ade-quate is disproved by two of the cases related in which the doses had been large and pushed after the first signs of trouble, the patient receiving six intravenous injections of neosalvarsan in four months each of 0.9 gm. This is the patient, a man of 44, who begged to have the eye removed on account of the persisting pains; corneal sclerotomy was done twice and gave considerable relief.

BRINK.

THE PERIODIC ASTHENIAS. J. Dejerine and E. Gauckler. (La Presse Méd., June 17, 1914.)

These authors have given this name to what they describe as a dis-tinct clinical entity characterized by the occurrence, at definite intervals, of crises of fatigue. They say that in the domain of psychiatry almost all the constitutional psychoses are dominated by a certain amount of periodicity. For instance, the periodic psychosis, manic-depressive psychosis, circular insanity, and more particularly psychasthenia and cyclothymia are all characterized by their periodicity. In many cases of cyclothymia, asso-ciated with the attacks of psychical depression there is also a pronounced physical fatigue. They here overlook the Kraepelian synthesis which allies these forms. There are some cases, however, in which there occur periodically attacks of physical depression which are not accompanied by any mental disturbance. These cases are regarded by the authors as of common occurrence clinically and are designated by them under the name "periodic asthenias." Similar crises in a minor form occur as a normal phenomenon in almost every individual. Extremely rare are those beings who possess a perpetual physical equilibrium, just as rare as those who display an even tenor of mind and character. Devoid of any psychological element, the mild asthenic crisis constitutes a simple and slight crisis of physical weakness. The individual affected gives evidence of a normal intellectual and moral activity. He manifests, however, repugnance for every physical effort; in fact, the slightest exertion causes extreme fatigue. There is at the same time a more or less pronounced loss of sexual desire. Some of the patients attribute their condition to atmospheric and possibly to transitory arthritic changes. The periodic asthenias occur equally in men and in women, usually in early life, and sometimes after infectious diseases such as typhoid fever or severe influenza. The attacks rarely exceed one week in duration and may last only one or two days. In some cases they recur three or four times a year, and in other instances they may be repeated every fifteen days. Apart from their periodicity the

chief characteristics of these attacks are their sudden appearance and disappearance and the absence of any apparent cause. There is a type of these cases in which the crises of fatigue are particularly severe. Physical effort is almost impossible. There may or may not be certain associated modifications in the pulse and arterial tension, changes in the sebaceous glands and hair follicles, digestive disturbances, etc. Attacks of migraine are frequently observed. Sleep is normal and the appetite is usually good. Frequently a loss of weight accompanies the crises. This loss may be considerable, amounting in rare instances to from ten to forty pounds. On the other hand, in some cases there may be a gain in weight. The duration of the major attacks is on an average two months, but there are cases which last much longer, in this respect resembling an attack of melancholia. The termination of the crisis is remarkably sudden. No etiological clue is furnished from the viewpoints of sex, temperament, constitution, heredity, and pathological antecedents. In the diagnosis of this condition, the clue to which resides chiefly in the periodicity of the attacks, a number of other conditions must be ruled out, such as ordinary physiological fatigue; the subjective fatigue occasionally observed in neuropaths; the asthenia associated with organic disease, such as tuberculosis, and disturbances of the ductless glands; constitutional neurasthenia, particularly in young people; syphilis, either inherited or acquired; and finally, paresis, which may be manifested in the beginning by attacks of marked asthenia. Frequently the diagnosis is made difficult by the presence of a secondary neurasthenia.

In seeking the cause of the periodic asthenias, the attention is firmly riveted on the ductless glands. The asthenia of suprarenal origin is well known. Similarly, asthenia is a marked symptom of myxedema and of exophthalmic goiter. Experimental and therapeutic tests have shown that the pituitary gland stimulates both striated and smooth muscle fibers. It would appear as if the physiological efficiency of the muscular system is dependent upon an equilibrium of the endocrinous organs. The interconnection of all the glands of internal secretion is a fact that has been demonstrated in many ways. The functional or organic impairment of any one of them leads to an impairment of the entire group. One fact stands out in the study of the functions of the ductless glands, namely, the periodicity of these functions and of their disturbances. This is particularly the case with the ovary and the thyroid. The periodicity of the phenomena of exophthalmic goiter is fully recognized. On the basis of the above facts, Dejerine and Gauckler believe that the periodic asthenias represent a rupture of the endocrinous equilibrium, which disturbance impairs the asthenic function of the ductless system. The rupture may be spontaneous or it may be synchronous with biliary or arthritic manifestations.

A therapeutic test, however, they believe throws strong light on the etiology of the condition. It has been found that the attack subsides upon the administration of thyroid extract in conjunction with the total extract of the pituitary gland. The dosage is from 0.10 to 0.15 gram of the former and 0.25 to 0.50 gram of the latter. With this medication the attack is brought under control in three or four days. The doses are then diminished to 0.05 to 0.02 gram and to 0.10 gram, respectively. Other elements in the treatment are the enforcement of complete rest during the attacks, and careful supervision of the general hygiene during the intercalated periods. One of the important points brought home in the

consideration of this condition is the conception of physical crises of fatigue entirely distinct from but comparable with the crises of mental depression, and having possibly a similar pathogenesis. Related to neurasthenia solely by virtue of their similar symptomatology, the periodic asthenias may be conceived as a melancholia of the body just as there is a melancholia of the mind.

JELLIFFE.

EARLY DIAGNOSIS AND TREATMENT OF MANIC DEPRESSIVE PSYCHOSES. A. H. Ring. (Bost. Med. and Surg. Jl., Sept. 3, 1914.)

The author notes that there are two somewhat typical ways in which the acute condition may come on: the first is sudden, the second is gradual In cases of sudden onset the first visit is frequently not made until mental symptoms predominate; but it is not uncommon to learn that these patients have been treated for a week or more for acute indigestion, and have been known not to be well for two or three months. After close questioning the family will admit that they now realize that for a year or more the patient has not been himself but they never suspected anything mental. In a second type, *i. e.* those of gradual onset, the mental sypmtoms do not become marked for some time, the physical symptoms predominating. Most commonly the patients come under treatment for digestive disorders, liver trouble, and the like. There is, perhaps, no single psychosis which occurs with such frequency. It constitutes from 12 to 20 per cent. of admissions to insane hospitals. In its early state there is no psychosis which so commonly goes unrecognized; it is tagged "just nervousness," "the blues," neurasthenia, or even as hysteria, and it frequently does not get beyond this mild form. These are the cyclothymic cases described by Hecker. Because of the mildness of its early symptoms and the slight degree to which the intellect is involved at first, its victims form by far the larger part of the so-called borderline psychoses. In the more severe forms with persistent insomnia, great elation or depression, and anomalies of nervous (volitional) control (excessive rapidity or retardation), it is easy enough to recognize manic depression, especially if accompanied by hallucinations or delusions. The preponderance of symptoms of manic depression are somatic. Whether of the depressive, manic, or the mixed phase it manifests itself mentally as a disturbance of the feeling, psychologically expressed as an exaggeration of the sense of pleasantness and unpleasantness. These patients frequently realize the mental disturbance before it is objectively evident. To this extent the personality is disturbed; but the patient can, if he exerts himself, in the early stage tell one that he knows the change is in himself, thus distinguishing his condition from dementia præcox, in which the patient insists that he is all right, but is abused by people or things outside him. This is not so true of the more advanced stage.

BRINK.

TABETIC ARTHROPATHIES. F. Oehlecker. (Beit. z. kl. Chirurgie, June, 1914.)

The author first calls attention to the fact that the arms are the seat of the neuropathic joint affection in syringomyelia while the legs are affected more often in tabes. The lack of pain in the tabetic joint affection is one of its most striking features. No other joint process, not even a mild tuberculous or deforming arthritis, not even a syphilitic

process, is so free from pain and other disturbance as a tabetic arthropathy. This affection is very rarely recognized as such by the general practitioner; it is frequently called rheumatism, tuberculosis, a sprain, or the like until other symptoms reveal the underlying tabes. As the patients feel so little disturbance from their joint trouble, no one pays much attention to it, while in fact the severest destructive processes are going on in the bones. There is seldom pain until pressure or suppuration involves the skin over the joint. The absence of pain in an arthritis should suggest possible tabes in every case.

Another characteristic of the tabetic anthropathy is the abnormal movability of the joint, especially hip and knee. A sudden swelling of the joint is usually from a complicating sprain or dislocation. The bones in and around the joint may feel grotesquely thickened and the whole aspect suggests something different from ordinary joint trouble. The pupil reflex is generally lost by this time and the tendon reflexes are modified, but the tabes has not reached the stage of ataxia, although the patients may have lancinating pains in the legs. A spontaneous fracture may be the first manifestation of the disease; the Wassermann reaction in the serum and spinal fluid is an aid in differentiation. He gives an illustrated description in detail of eleven cases and emphasizes the necessity for putting an end completely to all functional use of the joint, excluding it from use by appropriate orthopedic apparatus or casts, and starting a vigorous course of antisyphilis treatment. He has never witnessed any influence from the latter on the neuropathic arthritis, but it is indispensable to strive to arrest the tabes. When an operation is necessary, he resects the knee or amputates the foot and reports eleven cases in which he obtained solid healing of the bone, and says that this should be the aim. Tabetic arthropathy does not seem particularly predisposed to infection unless a fistula is already installed. He insists that the joint capsule and the synovia must be entirely removed when an operation is attempted, and the bones should be shaped in such a way that they will not slide on each other. The after-care is even more important than the operation itself, giving the bones the stimulus to repair from weight bearing. In many cases a solid Pirogoff stump is better than to have recurring trouble in the foot, but orthopedic treatment is the main reliance in nearly all cases.

BRINK.

Book Reviews

THE SEXUAL LIFE OF THE CHILD. By Dr. Alfred Moll. Translated from the German by Dr. Eden Paul. The Macmillan Company. New York.

This work is one of such practical service that a translation of it must be welcomed by English-speaking readers concerned for the welfare and development of child life, which must needs give large place to a consideration of the sexual life. The work is based on Dr. Moll's wide experience and observation in dealing with children and with questions of the sexual life in adults. The knowledge and conclusions thus obtained have been broadened and confirmed by extensive study of the work of others in this field. The treatment is a scientific consideration of facts, frank, straightforward and free from that sentimentality and unnecessary alarm which characterize popular works of this sort. It puts before the reader very plainly the facts of sexual life in the child, both normal and pathological, in order to consider the best means for the control or prevention of the latter manifestations, while providing for the best development of the normal life.

The enormous place that the sexual holds in child life even Dr. Moll fails to conceive fully. Had he arrived at a more complete understanding of that comprehensive conception of sexuality in child life advanced by Freud, whose theories and methods he subjects to criticism, he would have explained more satisfactorily the period of undifferentiated sexuality with its possibilities and tendencies normal or perverse, which manifest themselves as the child develops. By disregarding or practically denying the family complex and attempting to limit too much the term sexual he loses to some extent that broader basis which furnishes an explanatory background for many of the perplexities in the study of child life and makes for more effective educational work.

The author's conclusions, however, are by no means arbitrary. He fully recognizes the impropriety of defining fixed rules or principles of development both from the difficulty of exact investigation of the life of a child and the pervasiveness and diversity of manifestation of the sexual life.

He begins by briefly introducing his readers to the different periods of growth in the child's life. Then after a short discussion of the literature upon the subject of child sexuality he explains as a preliminary to his plan of work the anatomy of the sexual organs and their normal functioning. From this follow the differences to be found in the immature child and the gradual development of the sexual characteristics, primary and secondary. He separates very clearly the physical or *detumescence-impulse* from the psychosexual or *contrectation-impulse*, as he designates the two factors, and shows us how in the earlier stages of childhood they are differentiated and what variety of manifestation there is for each factor in the history of the child and of what importance this is to his sexual life.

Indeed, these are of necessity the two factors on which rests the entire discussion of the development of the normal sexual life, so manifold throughout the early years and the pathological manifestations all too

common. A careful investigation of the etiology of pathological sexual development emphasizes the difficulty of discovering fixed rules and defining variations in development. The development of individuals differs so widely that it is impossible to discover the limitation of what is normal and deviation from it, or on the other hand to determine in childhood what is but a part of the undifferentiated sexuality or the rudiment of a perversion. Freud's conception would here make the matter clearer, especially as, even as our author states, so much of later perversion is due to environmental influence, particularly to seduction by other children or by elders.

Herein lies the necessity for most intelligent and diligent application on the part of educators, preëminently the parents, first, that they may observe and understand the sexual life and development of the individual child and that they may then guide and instruct him to a right understanding and control of this life force in him. Particularly must the instructor, the parent, guard himself that neither by word nor deed shall his example, more potent by far with the child, counteract the effect of the teaching.

<div align="right">L. B.</div>

CONTRIBUTIONS FROM THE THIRD DIVISION OF THE NEUROLOGICAL INSTITUTE OF NEW YORK. Service of Dr. Pearce Bailey.

This creditable volume contains a number of original papers which have come from the workers in the Neurological Institute or from those whose chief stimulus has been received through work of Dr. Bailey or his staff.

There are fifteen papers in all, as follows: Tumors of the Pineal Body, by Drs. P. Bailey and Smith Ely Jelliffe; Spinal Decompression, by Drs. P. Bailey and C. A. Elsberg; Traumatic Erb's Paralysis in the Adult, by Drs. A. S. Taylor and L. Casamajor; Anesthesia in the Diagnosis of Spinal Cord Tumors, Surgical Diagnosis and Treatment of Tumors in and about the Spinal Cord, both by Dr. Bailey; Osteoarthritis of the Spine as a Cause of Spinal Compression, by Drs. P. Bailey and L. Casamajor; Alexia and Hemianopsia, by Drs. L. Casamajor and M. J. Karpas; Studien über Quellung von Nervengeweben, by Drs. J. Bauer and T. Ames; Nature of Cutaneous Sensation, The Nervous Mechanism of Hyperplasia, Function of the Node of Ranvier, by Dr. W. Timme; Manganese Poisoning of the Nervous System, by Dr. L. Casamajor; The Traumatic Neurosis, Fear and Desire as Factors in Human Conduct, by Dr. P. Bailey, and Blindness as a Wish, by Dr. T. Ames. This list shows a wide range of interests and reflects admirably the high grade of work done in this service of the Neurological Institute.

The Journal

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Original Articles

NEW CLINICAL INSTRUMENTS FOR THE MORE PRECISE ESTIMATION OF MUSCLE STRENGTH AND THE TENDON REFLEX THRESHOLD: THE CLINICAL MYOSTHENOMETER AND REFLEX LIMINOMETER

By Frederick Tilney, M.D.

The Clinical Myosthenometer.—It is often desirable to ascertain as accurately as possible the strength of various muscle-groups of the body. Several dynamometers are in use for this purpose, but they are either too limited in their applicability or too complex to be of the greatest clinical service. In the matter of terminology, there is some question as to the correctness of designating such instruments " dynamometers "; for this reason the term *myosthenometer* was selected as most exactly descriptive of the one here illustrated (Fig. 1). This myosthenometer was devised with the object of producing a clinical instrument which should have the widest possible range of application; at the same time being portable and relatively simple. It consists of a calibrated bronze spring contained in a cocabolar handle. A firmly supported shaft or plunger operates against this spring and is geared to an indicator which registers in kilograms on a metric scale. Upon the free end of the shaft is a swivel screw to which appropriate adjustable surface-plates may be attached; these plates

are of several different sizes, so that they may be adapted to small or large surfaces of the body. At the junction of the shaft and handle is a stationary finger crosspiece. This makes it possible to test several of the more important muscular elements in the grip.

The following photographs show the mode and possible range of application of the instrument. (Figs. 2 and 3.)

Fig. 1. Clinical Myosthenometer.

For purpose of comparing the muscle strength of corresponding groups upon the two sides of the body, it is necessary to apply the surface-plate in each instance at the same distance from the joint serving as the fulcrum against which movement is to be made or resisted. By a small amount of care in thus providing equal leverage in the corresponding parts examined, the margin of error may be reduced to minimum. The instrument does not in any sense furnish an ergometric indication of muscular capacity. It does, however, give a fairly accurate measurement of the motiofacient power of the muscles as well as of their non-motiofacient strength, as shown by their resistance against movement.

The writer has used the instrument for over three years and while it is not possible to establish any standard of strength for different ages or sexes, hyposthenic conditions, local or general, are readily recognized. The instrument furnishes a reliable means of following the course of such muscle weakness, either through progression or regression.
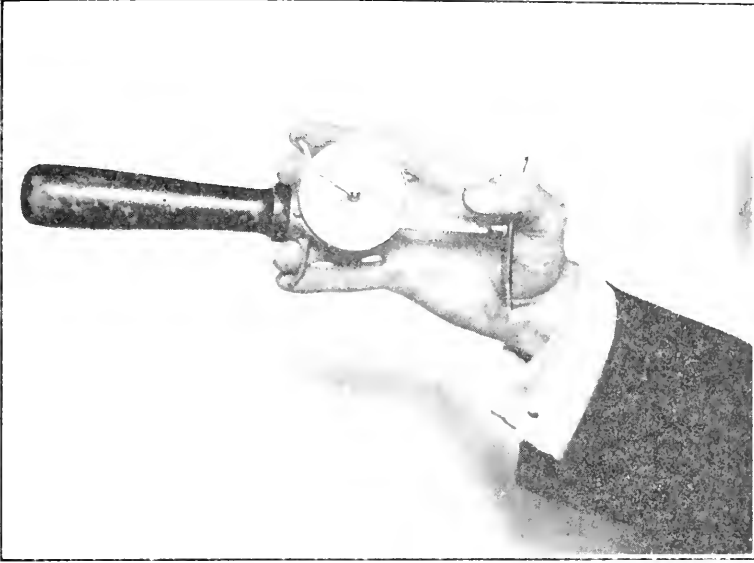
Fig. 2. Myosthenometer used in testing the grip.

The Reflex Liminometer.—By the usual means of examination, it is difficult in all cases to obtain a correct evaluation of the deep reflexes. Percussion by means of any of the instruments in use for this purpose fails to develop more than the grosser characters of any tendon reflex. It is possible by such means to note the excursion, rapidity and, to some extent, the force of the reflex, but these facts leave much to be desired in the complete estimation of the reflex action.

Instruments have been devised whereby the excursion of the reflex may be recorded and these serve the purpose excellently but in many cases, even under these circumstances, a definite judgment of the reflex status cannot be arrived at.

It has been deemed advisable by the writer to produce an instrument which might be controlled in three definite respects: (1) in delivering a percussion blow at the same point of the tendon upon any number of repeated applications of the percussion; (2) the delivering of a blow of known force on each percussion made; (3) to so grade the force of the blow that the least amount of impact necessary to develop the faintest trace of the reflex might be recorded. In this way the response appearing

upon the application of the least amount of percussion force would be the threshold reflex, and the instrument capable of producing these results may be termed the reflex liminometer.

This instrument consists of a cylindrical metal barrel in which is contained a plunger operating upon a calibrated bronze spring. The shaft of the plunger is notched so that when withdrawn from the barrel each notch is equivalent to .05 kilogram of percussion force. The plunger shaft is provided with a hard rubber tractile head, by means of which it may be withdrawn from the metal cylinder to any required distance, and held against the spring by a trigger device ready for release. An adjustable gauge controller, for which I am indebted to Dr. C. L. Nichols, makes it possible to regulate the percussion force for purposes of rapid repetition. The force of impact is delivered by the plunger to a fixed percussion head which protrudes about an eighth of an inch

Fig. 3. Myosthenometer used in testing anterior tibial group.
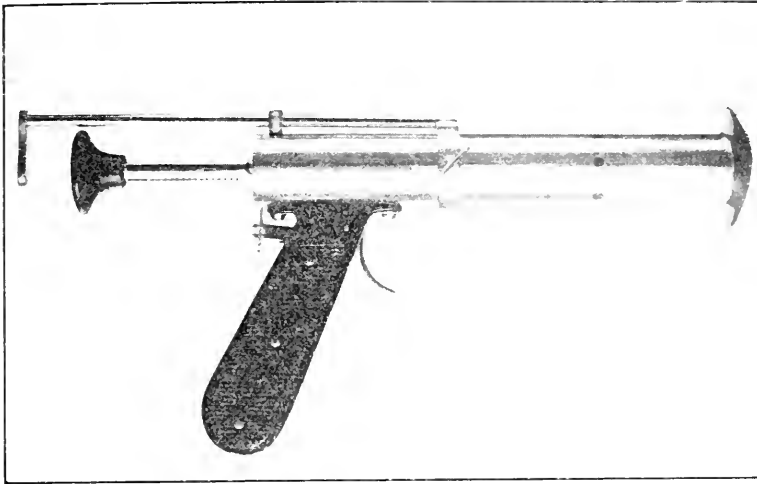
Fig. 4. Reflex Liminometer.

from the distal end of the cylindrical tube. At this end of the tube there is a concave plate adapting the instrument for application to any of the tendon surfaces upon which it may be desired to make percussion. In Fig. 4 the instrument is shown and in Fig. 5 it is seen applied to the patellar tendon.

Using this instrument it is possible to make close study of the
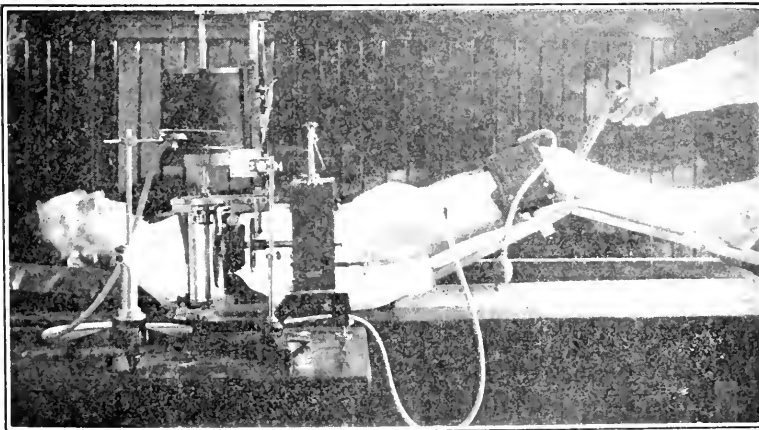
Fig. 5. Reflex Liminometer in connection with a Kimograph to Record Reflexes.

reflex reaction, not only as to its time and force but also with
regard to certain component elements which would escape notice
on more casual observation.   For this purpose cimographic trac-
ings may be made of the knee jerk by applying an air-cushion,
which connects with the appropriate tambour upon the thigh just
above the patella.   This air-cushion is held in place by means of
a leather cuff which is equipped with an air bladder similar to
that of the ordinary blood-pressure apparatus and inflated to a
given tension as indicated by a manometer.   In this way, by
employing the Pacquet chronograph, it is possible to determine;
(1) the period of reflex latency, (2) the principal and accessory
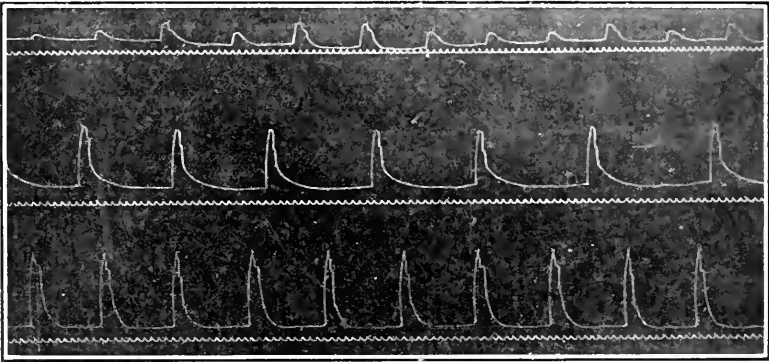
FIG. 6.   Reflex Curves in a Case of Hemiplegia.

contractions in the reflex, (3) the rate of the reflex; (4) its
duration; (5) its threshold character and value; (6) its general
characteristics in response to percussion of known force at a fixed
point on the tendon.

    The results of observation upon a limited number of nervous
diseases seem to indicate that certain types of reflexes are pro-
duced by certain pathological conditions of the nervous system
and that these differing types are best recorded by the method
just outlined.   Types of the curves as seen in hemiplegia are
shown in Fig. 6.

    A more extended study along these lines is now being made
at the Vanderbilt clinic and the results will subsequently be
published.

STATISTICAL STUDY OF HALLUCINATIONS IN THE MANIC-DEPRESSIVE TYPE OF PSYCHOSES[1]

By John E. Lind, M.D.

GOVERNMENT HOSPITAL FOR THE INSANE, WASHINGTON, D. C.

The original intent of this study was to ascertain whether or not the negro differed from the white in the frequency of hallucinations in manic-depressive psychoses, certain cases having come to the writer's attention of negro manics in whom the hallucinations appeared to be quite prominent. However, it soon became evident that other statistics would be obtained incidentally, so it was thought just as well to include these and give the paper a more general title.

The literature of this subject seems generally agreed that hallucinations are rare in manic-depressives. Tanzi[10] speaks of the "rarity of the occurrence of hallucinations." Remond[6] says, "Rarer still than delusions are hallucinations." Defursac[1] says, "Hallucinations are rare and fleeting." Diefendorf[3] says, "Hallucinations are rare." According to G. Deny[2] and Paul Camus, "The existence of true hallucinations in the course of depressed states is a rare phenomenon." Of the manic states he says in regard to these that hallucinations are "rare and usually ephemeral." Kraepelin[4] says that false perceptions are not often in the foreground. Stransky[9] says in his monograph that hallucinations are completely lacking in the majority of the cases. Ziehen[12] says that perhaps one fifth of his cases exhibited hallucinations. White[11] says: "Hallucinations are not infrequent. They are usually elementary in character, simple and transitory." Spitzka[7] seems to hold that hallucinations are frequent in mania and melancholia, but of course here we meet with a confusion of terms.

The source of the material utilized in this study may be understood and some idea of its value formed from the following: On April 1, 1908, the custom was inaugurated at the Government

[1] Read before the Washington Society for Nervous and Mental Diseases, February 25, 1915.

Hospital for the Insane, of daily staff meetings, where cases for discharge, visit, or parole were considered in full and opinions given by the senior members of the staff.   For a time, the records of patients who had died in the hospital were discussed, but later, this practice was abandoned.   However, all these latter cases were summarized and probable diagnoses established.   A card index of diagnoses was instituted, and when a case left the hospital, a card bearing the diagnosis as agreed upon at conference or as determined at death, assisted by autopsy findings, was filed in the card index.   This index has grown rapidly, so that on February 1, 1915, the time this study was completed, it contained cards representing 4,421 cases.   Of these, 250 were diagnosed as manic-depressive psychoses, that is 5.6 per cent.   (We include the involutional melancholia in this group.)   Kraepelin gives the percentage of occurrence of this psychosis in his cases as 10 to 15 per cent.

I wish to call attention here to the infrequency of this diagnosis in our cases, compared with the frequency at other hospitals. Glancing over the annual or biennial reports of eleven state hospitals which happen to be at hand, I find that this diagnosis in their admissions to the hospital was as follows:

Hospitals	Cases Admitted	Manic-depressive	Per Cent.
No. 1..............	258	29	11.2
" 2..............	325	60	18.4
" 3..............	836	167	19.9
" 4..............	1,021	221	21.6
" 5..............	587	129	21.9
" 6..............	2,378	712	29.9
" 7..............	253	92	36.3
" 8..............	301	119	39.5
" 9..............	248	104	41.8
" 10..............	635	408	64.2
" 11..............	455	310	68.1

Adding them up, we find that of 7,297 patients admitted to these eleven hospitals, 2,351 were diagnosed as manic-depressive, or 32.2 per cent. and taking the average of the percentages mentioned above, we have 33.8 per cent.   That is to say, these hospitals call one third of their admissions manic-depressives.   These hospital reports were taken entirely at random, in fact, they were all those reports which I found on the library reading table at the time, and which had been received so recently that they had not as yet been filed away.   None of them were more than a

few months old and they represented the following states: Indiana, Michigan, Missouri, Montana, New Jersey, Oklahoma, Texas and Virginia.

The current report of the Government Hospital for the Insane, shows 752 admissions during the year 1913–1914, with 45 manic-depressives, that is 5.9 per cent., just half that of the lowest figure in the reports quoted above and agreeing almost exactly with the proportion of such cases in our diagnosis system for the six year and a half period included in this study. Thus it will be seen that here we consider manic-depressive as a comparatively rare condition, in spite of the fact that we group the involutional melancholia under this head, and we are constantly fortified in this opinion by seeing cases which on cross-section appeared to be manic, turn out on longer observation to be something else, usually præcox.

In spite of the fact that there was such a small number of these cases it was thought better, to avoid all possible cavil at the deductions reached, to review all of them carefully and throw out such as might be open to doubt. This was accordingly done and those which showed arteriosclerotic changes, which had been cross-indexed under manic depressive and præcox or about the diagnosis of which considerable doubt had existed at the staff conference were elided. Thirty-four cases were thrown out in this manner, leaving 216, or 4.8 per cent. of all cases diagnosed.

On February 1, 1915, there were in the Government Hospital for the Insane, 3,023 patients. Of this number, 28 were regarded as manic-depressive, that is not quite one per cent.—.92 per cent., to be exact. The smallness of this figure is, of course, understood when we consider for a moment that the manic-depressives constitute the transients, so to speak, of a hospital of this sort, while the other psychotics remain in the hospital. Thus up to a certain point, the proportion between the population as a whole and the manic-depressive is in inverse ratio to the length of time taken into account. The 28 cases in the hospital February 1, 1915, were added to the 216 obtained from the card index, making a total of 244 cases studied.

In reviewing these 244 cases in regard to the occurrence of hallucinations, the history of each case was first considered. The medical certificate accompanying the patient on admission was naturally consulted first as it purports to contain information as

to the onset of the psychosis, symptoms present formerly and now, etc. Unfortunately many of the medical certificates which we receive have information on them which is of little or no value to us. Take for instance, the response to the direction: Describe as fully as possible the present symptoms of insanity. I have collected a few samples showing wonderful descriptive powers, to say the least.

One doctor writes: " Has delusions of grandeur—the peculiar expression of his eyes—the condition of his body and his cell, etc."

Another: " Becoming very irritated and very talkative."

Also the following: " Began by gradually increasing mental and physical excitement which reached an acute maniacal condition, necessitating her confinement."

And: " Can't recover—head feels confused and can't be hopeful."

Another one: " Disorderly—confused statements—voluable (?)."

In two cases this blank was occupied by one word only, in one case, " Melancholia," and in the other, " Violent."

It can be readily seen that medical certificates such as these have neither a positive nor a negative value in ascertaining the history of the case, and all such I marked in my table as, " History not obtainable or too meager to use." In striking contrast to the above were the medical certificates accompanying patients transferred from the Washington Asylum Hospital which were made out under the direction of Dr. D. Percy Hickling, formerly visiting physician to that hospital, and now alienist for the District of Columbia. From these certificates I obtained much valuable data. In other cases, too, although the medical certificate was unavailable for my purpose, I was able to obtain the information I required from other sources.

I have divided the statistics into two parts, the first dealing with data of the cases before admission, and the second the record of the observations made after admission. Of course, no satisfactory criteria exist for evaluation of the first part of these statistics and they are only tabulated here because they were obtained incidentally. To the second part of the statistics I think some little value may be attached, comprising, as they do, the results of daily observations of patients over periods varying from one month to a number of years. Moreover, these observations were

made by specialists in mental disorder and were subject to various checks.

I might mention here a common error in recording observations of mental cases, especially manics, and that is the statement that hallucinations of sight and hearing exist when the patient is only expressing his emotional exaltation. For instance, we hear a manic saying that he saw King David and talked with him last night, or that President Wilson came in his room and offered to abdicate in his favor. On close investigation, we find these to be phantasies and not actual false sensory perceptions.

Of course, I realize the many possibilities of error in the observations from which I drew my conclusions, but although they were made by a number of individuals, there is a certain uniformity about them. The method of examining cases at the Government Hospital for the Insane has been for a number of years substantially the same, and new men entering the work here are trained in the same way. Then too, changes of physicians from one service to another provides a check for the observation of every patient.

The table I have made follows:

PREVIOUS HISTORY OF CASES

| | White | | Negro | | Total |
	Male	Female	Male	Female	
History of auditory hallucinations.........	19	10	2	7	38
" " visual "	16	9	1	5	31
" " hallucinations (unclassified)......	1	1	0	0	2
" " other hallucinations.............	0	0	0	1	1
No history obtainable or too meager to use ...	41	39	4	17	101
History negative........................	42	29	6	15	92

OBSERVATIONS OF CASES AT THE GOVERNMENT HOSPITAL FOR THE INSANE

| | White | | Negro | | Total |
	Male	Female	Male	Female	
Auditory hallucinations, prominent.... ...	6	5	2	2	15
" " slight..........	7	9	1	10	27
Visual " prominent.........	3	3	1	2	9
" " slight............	3	4	1	4	12
Other " prominent........	0	0	0	0	0
" " slight............	0	2	0	0	0
No hallucinations.......................	92	68	9	28	197

Taking the white males first, of 107 cases, the history before admission was negative in 42 cases, there was a history of auditory hallucinations in 19 cases, a history of visual hallucinations in 16 cases and hallucinations—kind not specified—in one case. In 41 cases, the history did not mention hallucinations, but was so meager as to be valueless in this regard. While here 92 cases showed no hallucinations, 13 cases had auditory hallucinations, in 6 cases, they were prominent and in 7 slight, 6 cases had visual hallucinations, 3 prominent, and 3 slight.

If then we consider the histories of all white males admitted, we find 22 per cent. of them with a record of hallucinations, if we reckon only with those whose histories were adequate, we find 36 per cent. with this record. From observation of these 107 cases at the Government Hospital for the Insane, we find that 15 of them suffered from hallucinations at one time or another while patients here, or 14 per cent.

Of the 82 white females, the history before admission was negative in 29 cases, there was a history of auditory hallucinations in 10 cases, of visual in 9 and of hallucinations—kind not specified—in one case. The history was inadequate in 39 cases. While under our observation, 68 had no hallucinations, 14 had auditory hallucinations, 5 prominent, and 9 slight. Seven cases visual hallucinations, 4 prominently and 4 slightly, and 2 cases had visual hallucinations to a slight degree.

Considering the histories of all white females admitted, we find a record of hallucinations in 24 per cent. Taking only those histories which were adequate we find the record to be 46 per cent. In our observations here, we found hallucinations present in 17 per cent. of all white female manics.

Taking up the histories of the 13 colored males, 2 were reported to have had auditory hallucinations and one visual. In four cases the history was inadequate and in six cases negative. Our observation here shows auditory hallucinations in 3 cases, in 2 they were prominent and in one slight. Two cases showed visual hallucinations, one prominently and one slightly. Nine cases showed no hallucinations while here.

Thus according to all histories of colored male manics, we find hallucinations in 23 per cent., according to the more complete histories, in 33 per cent. Our observations showed hallucinations in 30 per cent.

Of 42 cases of colored females, 7 came to us with histories of auditory hallucinations, 5 with a history of visual and one with a history of other forms. In 17 cases the histories were inadequate and in 15 cases negative. While under observation here, 12 cases showed auditory hallucinations, in 2 cases prominently and in 10 cases slightly, 6 cases exhibited visual hallucinations, 2 prominently and 4 slightly. In 28 cases there were no hallucinations.

According then to all histories accompanying these patients 24 per cent. showed hallucinations while according to the fuller histories 40 per cent. According to our observations they were present in colored female manics in $33\frac{1}{3}$ per cent.

Tabulating the results as obtained from the histories of the cases accompanying them we have then hallucinations present as follows (expressed in per cent.) :

	W. M.	W. F.	C. M.	C. F.
According to all histories	22.4	17	23	23.8
According to complete histories	37.8	32.5	33.3	40

The accuracy of the above table is of course open to serious doubt, but more value can be attached to the following one, which represents the frequency of occurrence of hallucinations in manics, according to our observation of them. This table is also expressed in per cent.

	W. M.	W. F.	C. M.	C. F.
Auditory hallucinations	12.1	18.2	23	28.5
Visual hallucinations	5.6	8.5	15.3	14.2
Other hallucinations	—	2.4	—	—
Hallucinations	14	17	30.7	33.3
No hallucinations	86	83	69.3	66.6

The conclusion then that we may be permitted to draw from these figures is that in manic-depressive psychoses, hallucinations occur somewhat more frequently in the female than in the male, and about twice as frequently in the negro as in the white. About one sixth of all white manics and one third of all colored manics have hallucinations. In other words, the promptings of the unconscious come more readily to the surface in the negro than in the white and in woman than in man. That is, the unconscious

material lies nearer to the surface and the barriers separating it
from consciousness are not so strong. This is due, no doubt, to
the fact that only a few generations separate the American negro
of to-day from savagery and he has not in that time been able to
acquire more than a veneer of civilization which easily cracks
under stress of any kind.

Since making the above study, there has been published a
paper by A. W. Stearns[5] dealing with hallucinations. He re-
ports 54 cases, of which 10 showed hallucinations, that is 18 per
cent. (more exactly 18.5 per cent.). This corresponds very
closely with my results for white patients, his percentage is
slightly higher, so it may be that he had a few negro patients in
his series.

One other point which seemed somewhat striking was the
great infrequency of this psychosis among male negroes. It
seems to be the general impression that manic-depressive is a
common disorder among this class, but the reverse seems to be
the case and if we consider that this handling of a conflict belongs
essentially to a rather high plane of development this is not sur-
prising. True, excitements are very common in psychotic negroes
(in fact, in normal ones also) but on close study these are usually
found to be præcox in origin or associated with some luetic or
arteriopathic process. The erroneous impression as to the preva-
lence of manic-depression in the negro arose, I think, largely
from the former almost universal custom of applying the generic
term "mania" to nearly all excitements. Even now, it is used
by the laity and by less progressive members of the profession to
cover a multitude of symptoms.

Unfortunately, I am not able to quote accurately the number
of negro male mental cases, the winnowing of which resulted in
the 13 cases cited above, but I can say roughly, that these were
about 650, which would give us a percentage of occurrences of
exactly 2 per cent. It is worthy of note that more colored males
are admitted to the hospital yearly than colored females (650 to
485 in the period studied), yet I found more than three times as
many manic-depressives among the latter. Moreover, in 109 col-
ored males admitted to the hospital during the year 1913–1914,
only three were diagnosed as manic-depressive and later, the
diagnosis of one of these was changed to dementia præcox, mak-
ing a percentage of 1.8 per cent., as contrasted with 5.9 per cent.

of manics in all admissions and with 4.5 per cent. of colored females. Also of 402 colored males in the hospital February 1, 1915, not one was regarded as a manic-depressive. O'Malley[5] gives the percentage of occurrences in colored females as 8.7 per cent. She mentions 30 cases in 345 colored females.

In conclusion I might mention the fact that a great many of the cases which I was forced to throw out because of doubt as to the diagnosis had hallucinations and in some of the cases which had hallucinations and were regarded as manic features existed which might on further elucidation have thrown doubt on the case. I have preserved a record of the cases which showed hallucinations, 47 in all and hope at some future date to be able to trace their history antecedent and subsequent to their observation here with the hope of finding out what part, if any, hallucinations play in the manic-depressive psychosis.

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TWO SUCCESSFULLY OPERATED CASES OF EXTRA-DURAL FIBROMA COMPRESSING THE CORD[1]

By Peter Bassoe, M.D.

CHICAGO

Case I.—A woman sixty years old was first seen by the writer at the Swedish Covenant Hospital on February 13, 1911. In the spring of 1910 weakness in the right leg gradually set in with considerable pain at the knee, and in the fall of the same year pain was felt in both legs from the knees down. In the summer she began to notice girdle sensation at the level of the umbilicus. In December she became unable to stand up. She was much troubled by violent muscular contractions in the legs. There was no sphincter disturbance.

On examination there was found complete paralysis and great rigidity of both lower extremities. When the patient attempted to raise herself to sitting position the umbilicus was displaced upward over an inch (Beevor's umbilicus sign). Knee and ankle clonus and bilateral Babinski sign were present. Arm reflexes were normal. Abdominal reflexes were absent. On the right side there was loss of cutaneous sensation of all kinds below the level of the umbilicus, and on the left side below a level two inches higher. The Wassermann test with the blood was negative. On making lumbar puncture the needle apparently readily entered the canal but no fluid was obtained.

A diagnosis of probable intraspinal tumor at the level of the ninth or tenth thoracic segment was made and on February 28, 1911, laminectomy was performed by Dr. O. T. Roberg. At the level of the eighth thoracic vertebra there was found a grayish, rather firm, extradural tumor attached to the left side of the vertebra, and measuring 2.5 by 1.5 cm. The dura, which was considerably displaced to the right, was not opened but the entire tumor was removed.

On examination twelve days later, sensation was nearly normal but there was no change in the paralysis, although the rigid-

ity was slightly lessened. Within another week motion began to return and by April 1 the patient was able to execute feebly all muscular movements of the legs, better on the right side. The spasticity was greatly reduced, but the ankle clonus and Babinski sign remained. Sensation was normal. A few weeks later she began to walk with the aid of the nurses and in June, 1911, she was able to walk away from the hospital.

When seen again by the writer in August, 1913, she appeared perfectly well. The knee and ankle jerks were somewhat increased but there was no clonus.

Histological examination of the tumor showed it to be a simple fibroma.

At the present time, December, 1914, the patient is in excellent health and has no difficulty in walking.

CASE II.—A married woman twenty-five years old was admitted to the Presbyterian Hospital September 21, 1913, complaining of weakness, stiffness and sharp pains in both lower extremities. The onset was in March, 1912, with a tired feeling in the legs and pain in the left lumbar region. The latter lasted for two or three months only. By October, 1912, she became unable to walk. In August of the same year she lost control of the sphincters, but after six months she regained control of the rectum and, to some extent, of the bladder. In addition to sharp pains in the thighs she suffered from severe headaches which were attributed to nephritis.

Examination.—Spastic paralysis of both lower extremities with knee and ankle clonus and Babinski sign on both sides. The upper abdominal reflexes were present on both sides, the left lower absent and the right lower weak. Loss of cutaneous sensation, complete as to tactile sense, partial as to pain and temperature sense, in all parts of the lower extremities, and partial loss of all sensation of the lower part of the abdomen below a horizontal line three inches above the pubes.

The Wassermann test with the blood and spinal fluid was negative. The spinal fluid contained three cells per cubic millimeter. The Nonne-Apelt globulin reaction was very strong, and the Lange colloidal gold test gave a marked reaction, and at much higher dilution than is seen in syphilitic lesions, the maximum being at 1 to 640 (that is) in the seventh tube, the first one being one to ten).

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X-ray examination showed a definite mass along the left side of the spine in the lower thoracic region, most marked at the tenth thoracic vertebra.

October 1, 1913, laminectomy was performed by Dr. Dean D. Lewis. The arches of the lower five thoracic vertebræ were resected and a soft tumor mass was found. It was outside the dura which was pushed to the side so as to cause a flattening of the cord, and the tumor was intimately connected with the bone, particularly at the tenth vertebra. The capsule of the tumor was incised, stitched to the lumbar muscles, and a piece of tumor removed for histologic examination. Removal was not attempted on account of the extent of the tumor and its probably malignant nature. An effort was merely made to relieve the pressure on the dura and cause the tumor to grow outward into the lumbar muscles rather than into the spinal canal.

Contrary to expectations, the patient improved very rapidly. The next day she began to move the toes and sixteen days after the operation she was able to take a few steps when supported by two nurses. By this time the sphincter disturbance had disappeared and cutaneous sensation was normal, while the sense of passive movement was still impaired. Patellar and ankle clonus and Babinski sign were still present at this time. Improvement kept on steadily and the patient left the hospital on November 12.

Histological examination of the tumor showed it to consist of fibrous tissue rich in spindle-shaped cells, and to be edematous, the edema being responsible for the soft consistency. Histologically it must be considered a fibroma rather than sarcoma.

When next seen, on September 1, 1914, the patient only complained of a little stiffness and uncertainty when walking, and occasional cramps in the muscles of the right thigh, but on the whole she was in very good health. No sphincter disturbance remained. The knee and ankle jerks were still exaggerated and ankle clonus of moderate intensity was present, as well as bilateral Babinski sign. The abdominal reflexes were present but the left lower was weak. A soft, non-adherent mass could be felt along the lower third of the laminectomy scar.

At the present time the patient has only a little stiffness and uncertainty in walking and the muscular cramps are slight.

Society Proceedings

ABDERHALDEN REACTIONS AND DEFECTIVE MENTAL AND PHYSICAL STATES

By S. D. W. Ludlum, M.D., and E. P. Corson White, M.D.

Various cases of defective conditions in young people examined with the idea of getting certain Abderhalden reaction formulæ for different states.

This has been done with a considerable degree of success, the results of which are comparable with reactions obtained on the blood of experimental animals.

Dr. Henry A. Cotton, Trenton, N. J., said that both the paper by Drs. Ludlum and White and by Dr. Stewart Paton had been extremely interesting for he agreed with Dr. Barker that the study of internal secretions to-day is one of the most important problems for the medical man and especially for the psychiatrist. The influence of the secretion of the ductless glands upon mental abnormalities, especially in conditions such as dementia præcox, appears to be a question which is well worth careful study. The paper by Dr. Paton seems to support this view. In the primitive conditions described by him we find that although the anatomical structure of the nervous system is present the nervous activity does not commence until the glandular organisms are pretty well advanced. From his investigation it would seem that nervous activity is dependent upon some of the glands of internal secretion, especially the suprarenal and thymus. Arguing from these primitive conditions as described by Dr. Paton it seems entirely logical to state that when certain glands are not functioning properly the effect of this abnormal functioning would be reflected in the brain and nervous system. In other words that the various functions of the central nervous system are dependent upon certain biochemical elements for their activity.

Dr. Cotton also said that he could agree with Dr. Jelliffe in regard to the influence of psychic phenomena on the glands of internal secretion, but did not believe that we could regard these phenomena alone as causing a disturbance in glands unless the glands were in some way abnormal. Given some fundamental defect in the various glands of internal secretion,

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often fright and other physical factors will produce changes and we have a vicious circle started.

In the last two years they had been studying dementia præcox from the viewpoint of the function of the glands of internal secretion. Following out Cushing's ideas in hypo-pituitarism they examined a large number of cases for changes in the biochemic metabolism. These patients were put under special observation and special attention paid to blood pressure, sugar tolerance, polyuria, etc., and although the work is far from complete, at the same time certain facts have been found which support the view that the pituitary gland was at fault in a certain class of cases. According to Drs. Ludlum and White the pituitary cases do not show abnormal Abderhalden reactions. Further experiments were made by injecting spinal fluid taken from dementia præcox patients into the jugular veins of rabbits. According to Cushing, if the spinal fluid contains the secretion of the posterior lobe of the pituitary gland by injecting the fluid into rabbits a spontaneous glycosuria is produced in the rabbits. When spinal fluid from cases of paresis was injected into rabbits they got a spontaneous glycosuria. In no case of dementia præcox were they able to produce this phenomenon. While these findings are not final, they indicate certain paths which are to be investigated. It is probable that there are various types in dementia præcox in which various glands would be affected. One group of cases might be due to the thymus, another to the pituitary gland, and there are probably other glands which will have to be considered. As these studies develop we can at least look for some definite facts, but we should not jump to conclusions or attempt any glandular therapy until we had definite findings that certain glands were at fault.

It is very important to carry on experimental work as indicated by Dr. Ludlum and others and a closer study of the biochemical metabolism will tend to solve the etiology of dementia præcox.

Dr. Alfred Reginald Allen, Philadelphia, said he had been much interested in Dr. Ludlum's work for about a year and a half and its practical application, as seen at the University Dispensary, had been most stimulating to him and he believed to others. In two of his cases, which Dr. Ludlum has already reported, treatment according to the Abderhalden findings was instituted. The result in each case was completely satisfactory. The most recent case in which Dr. Allen had the privilege of Dr. Ludlum's advice was a young woman of 27 years of age, who came of a very neurotic, psychasthenic stock. She was greatly depressed, with at times feelings of suicide. She was a student in the University of Pennsylvania and stood high in her class until a year ago when she began to show poor results in her examinations and in the class room. She came to Dr. Allen and he spent a number of weeks endeavoring to aid her. Failing to better her condition he sent her to Dr. Ludlum, who by his Abderhalden work found a reaction to ovary and pancreas and on his suggestion Dr. Allen put her on extract of thymus. The result was truly remarkable. Dr. Allen said he had no right to express an opinion on the theoretical soundness of the Abderhalden reaction, but the remarkable change in the picture of this girl was such as he had hardly ever witnessed. He gave her thymus for a week or ten days and then stopped for a week or ten days, during which interim she would get iron in the form of Blaud's pill. She now stands well in the first quarter of her class at the University. All of her mid-year examinations were passed "*distinguished*." Dr. Allen stated he called attention to this case to illustrate the point that

however faulty the Abderhalden hypotheses may be held by the serologist, from a clinical standpoint the methods of Dr. Ludlum are successful in a large enough percentage of these cases to entitle them to consideration as valuable aids to both diagnosis and therapy.

DILATATION OF CEREBRAL VENTRICLES IN VARIOUS FUNCTIONAL PSYCHOSES

By E. E. Southard, M.D.

Cases of dementia præcox, manic-depressive insanity and involutional melancholia studied photographically. The dilatation of the ventricles often more marked in posterior parts. Correlation of dilatation with excitement.

Dr. D. J. McCarthy, Philadelphia, said he thought this study of Dr. Southard's very illuminating from the standpoint of what might be termed the abnormality of brain tissues. One of the most difficult things the neuropathologist has to face in correlating pathological conditions of the brain with symptomatic phenomena is to determine whether the variation from the normal is pathological. Only one method exists for the neuropathologist to get a fairly definite idea of what constitutes a normal condition. Not only the microscope, but the general state of the brain substance, the condition of normal meninges, the normality of blood vessels and blood supply to the brain, there is only one method—to see in succession and in a relatively short time a tremendous mass of material. This study which has interested Dr. Southard had interested Dr. McCarthy, and he had examined 500 brains of patients dying from advanced pulmonary tuberculosis. This question of distention of ventricles in the Reports of the Phipps Institute is noted, together with a corresponding amount of atrophy and associated not only with ependymal changes, but also changes in the choroid plexus. The study of dementia præcox was closely associated with pulmonary tuberculosis and the condition is one in which there is apt to be a rather marked loss of body weight as the patient goes on to the terminal stages. The loss of brain substance with body weight as in cancer and tuberculosis would have to be correlated before any relation of brain substance in connection with the symptomatic manifestation could be drawn. In the tuberculous group of cases there was a moderate to advanced stage of distention, as Dr. Southard has shown, associated with atrophy of the cortex grossly and under the microscope. This atrophy was almost uniformly limited to the parietal and occipital regions, the anterior part of the brain remaining apparently normal. In advanced cases these was a pathological condition of the ependymal and subependymal tissues, a condition of lysis or condensation, so to speak, of the subependymal tissues. In the subependymal tissues there were large masses of hyaline bodies which were not the hyaline bodies we see in paralysis agitans and conditions of that kind. When you took the ventricular fluid you found the same condition. In a large number of cases the ventricular fluid congealed when hardened in formalin. Dr. McCarthy said he was not able to determine whether the condition was normal or whether it was pathological. He said he termed it a gelatinous exudate as contrasted with the tendency of the normal ventricular fluid to remain fluid. Dr. Southard must realize that unless one had a

mould to take the brain in, to keep it in, that there would be a tendency for the brain tissue to have this slit. Dr. McCarthy's method is to make a transverse section of the brain adapted to showing up the entire ventricle, the lateral ventricles anteriorly and posteriorly and using an arbitrary method of finding out the measurements. Although the measurements were made in some conditions, he thought Dr. Southard was now beginning where we should have begun some fifteen or twenty-five years ago in working out problems of neuropathology.

Dr. Spiller said it was important to know the ages of the persons from whom the brains were removed. In older people we might expect greater enlargement of the ventricles than in younger people. He asked whether Dr. Southard had measured the ventricles of the brains of many persons who were not strikingly abnormal so far as the brain was concerned. He thought if one examined such brains he would find a great variation in size of the ventricles. Dr. Spiller said he had a large number of brains in his laboratory in which the ventricles varied in size. They were from persons who were not supposed to be without nervous disease, so that one cannot determine from these whether such variations occur in persons who are supposed to have normal brains. It would make a great difference in the appearance of the ventricles if the section were made in the brain as soon as removed or after the brain had been hardened. Dr. Spiller said he had always followed the method of horizontal sections, and these had some advantages over frontal sections. They permitted a better observation of the basal ganglia and adjoining parts, they afforded better preparations for gross specimens, and they were equally capable of being made into microscopical serial sections. It is true, however, that many prefer the method of frontal sections.

Dr. Archibald Church, Chicago, said in view of the fact that neurologists are more and more becoming interested in intraventricular conditions and choroid functions, he would recite a little experience of a brilliant coworker of his, Dr. Lespinasse, who devised and carried out in one case a new method of controlling the choroid, that is of destroying the choroid within the ventricle. It occurred to the operator that he could examine the choroid and the intraventricular area by means of a short cystoscope. A chi'd with hydrocephalus came under his care and after introducing the instrument through the parietal cortex, he was able to see the choroid floating in the fluid. Through this same tube he introduced an electrical instrument and cauterized the choroid which shriveled up to a very small mass. Within three days the tremendous dimensions of the head present before the operation entirely disappeared and the cranial bones collapsed upon themselves. Unfortunately the child perished within a week.

Dr. Southard said that his method of preserving the brain was the Retzius method of suspension of the brain in formaldehyde upon threads passed under the basal vessels; the brain comes through in this method without distortion. No brain should be placed in a jar, packed round with cotton, since this method invariably produces distortion. Some might think that brains should be formalized in the skull, *in situ*. Dr. Southard felt that this method was to be deplored from the standpoint of bacteriology. Of course, a special series, such as Dr. Cushing's brain tumor series, might require a different technique.

In reply to Dr. McCarthy, Dr. Southard thought some of the conditions spoken of might be due to secondary invasion of organisms.

With respect to Dr. Spiller's remarks, Dr. Southard preferred the
frontal method of section of the brain, not because it was a German
method, as opposed to the French method, but because if one were later
to make total brain sections for microscopic purposes, the technique was
much easier with the frontal section than with the horizontal section as
advocated by Dr. Spiller. Moreover, Dr. Southard felt that on account
of the metameric arrangement of the nervous system, there was a good
deal to be said for the method of frontal section on theoretical grounds.
At any rate it is unwise for any one to condemn the frontal section
method as entirely unscientific. Dr. Southard could not forbear saying
that although the horizontal section method might have its special advan-
tages, he felt that the frontal section method had equal advantages and
perhaps greater ones.

The question of artefacts had been raised. Dr. Southard was un-
willing to take the opinion of any one as to artefacts who had not made
elaborate systematic studies from fairly large collections of brains and
studied his results with the aid of photographs. Dr. Southard was
inclined to agree with Nissl, who once somewhat whimsically stated that
everything you cannot photograph was subjective.

As to the question of normal brains, Dr. Southard would be quite
willing to work upon normal brains if there were any to be found; the
medicolegal was notoriously inadequate for purposes of control. The
true pathological method was to examine as large a number of brains as
possible from all sorts of conditions,—insanity, epilepsy, feeblemindedness,
criminality, nondescript medicolegal material and general hospital material.

A BRIEF REVIEW OF A YEAR'S NEUROSURGICAL WORK, WITH SPECIAL REFERENCE TO SPINAL CORD LESIONS

By B. Sachs, M.D. (neurological aspect), and C. A. Elsberg, M.D. (surgical aspect)

Short review of neurological material at Mount Sinai Hospital, New
York, during the past twelve months, with remarks upon the indications
for operation and results obtained by operative interference. The symp-
tomatology of the cases of spinal cord disease; peculiarities in the level
symptoms; variation of symptoms; indications and contraindications to
surgical treatment.

Dr. B. Sachs said it seemed to him that the blood vessels had their
innings at this meeting, and while he thought it would be justified if we
treated the subject with some skepticism, yet he thought that the results
that had been achieved in some of those cases were so remarkable that
we must take the possibility into account that the blood vessels really do
that which has been claimed for them. Personally, he must say that it is
rather difficult to conceive of a pressure or of some other influence exerted
by a merely dilated blood vessel. It is difficult to conceive of this pressure
being great enough to bring about such marked symptoms as Dr. Elsberg
described in several of these cases and whether they are able to explain
this influence or not we must take it into account. To refer to the case
of the Turk referred from Dr. Sachs' service, that case presented all the
symptoms pointing to a very definite focal lesion so definite that they were
at least suspicious of its being a neoplasm, and they would not have been

surprised if they had encountered at the time of the operation a neoplasm of considerable size. The findings at the time of operation have been described and the question arises, with all due deference to Dr. Elsberg's views, as to whether or not that lesion as found would seem sufficient to account for the symptoms. There was no other lesion and after the operation the improvement was very marked and this man had recovered absolutely and felt able to return to his work, had reported several times since operation and is a well man, with perfect health at the present time. In view of the experience had in this case and some other cases presenting very definite symptoms we cannot altogether throw aside the view that such abnormality of the blood vessels may have something to do with the symptoms. At all events let us keep an open mind on the subject. The only other point Dr. Sachs made upon this entire subject is that this case and a number of others they have had have led Drs. Elsberg and Sachs to this view, that whenever we have definite symptoms or symptoms pointing very definitely to a well-localized region and where they have reason to suspect a definite lesion, that in those cases they are entirely willing to have laminectomy done as a purely exploratory measure. In other words, Dr. Sachs thinks we can put it this way: Given any case with chronic spinal symptoms of a progressive character of uncertain origin and an exploratory laminectomy nowadays is justifiable. They consider laminectomy a perfectly safe procedure. The surgeons nowadays have practically no deaths from the operation itself, or should have a very small percentage of fatalities. The operation is practically a safe one and as an exploratory measure he considers it fully as safe as exploratory craniotomies have been considered to be for some time past. What the actual beneficial result of the laminectomy is it is difficult to gauge, except that spinal decompression is of just as great importance as is cerebral decompression in cases of intracranial lesions. The possible rôle that these abnormal blood vessels played is interesting, but the great importance to Dr. Sachs was the fact that it proves that there are cases with very slight lesions which do remarkably well after exploratory laminectomy.

Dr. J. Ramsay Hunt said he had been very much interested in Dr. Elsberg's presentation. He had an opportunity of seeing some of the cases and discussing them with him. His own feeling has been, and he thought Dr. Elsberg agreed in part, that in the case of these dilatations the condition is secondary and not primarily a vascular one. In other words, that there is a definite focus of disease within the cord that secondarily involves the circulation either by pressure or by thrombosis and that this is registered on the surface by these varicosities. Dr. Hunt hardly thought that such dilatations alone would cause cord symptoms such as were present in these cases. From the standpoint of symptomatology he thought the chief interest would be the possibility of the varicosities producing root symptoms. He said he could readily see that a dilated vein in the posterior root might give rise to pain of radicular origin. It is now well recognized that varicose veins of the lower extremities are not infrequently associated with varicose veins of the sciatic nerve. A late statistical study shows that only a few of these cases have given rise to any symptom, therefore in the case of a peripheral nerve it is quite possible to have a considerable degree of stasis, with varicose dilatations of the vessels without the production of symptoms of sciatica.

Dr. Ernest Sachs said that the cases of Dr. Elsberg were extremely interesting and he was especially interested because Dr. Elsberg had con-

nected these cases with his report of yesterday, but Dr. Sachs wanted to sound a note of warning which he thought was perhaps timely. Surgeons are also human and he recalled Professor Aschoff's statement in Freiburg, who with great hesitation and regret when brought face to face with an autopsy without anatomical findings declared that the patient died physiologically. In the same way it is a very trying thing for the surgeon to do an exploration and not find the lesion that he expects to find and there might be a tendency in consequence to call what is physiological, pathological. That there may be great variations in the blood vessels through the body is very well known and he thought perhaps Dr. Elsberg was the first one to have had an opportunity or to have gone into the study of the variation of the blood vessels of the spinal cord. He himself has indicated that in his paper, and would be the first to acknowledge that possibly these variations are physiological and not pathological. Another point to keep in mind is that the very great size that these vessels assumed at operation may be influenced by the anesthetic. A slight cyanosis both in craniotomy and at spinal exploration may cause a tremendous dilatation of veins. As to the matter of spinal exploration he thought the idea of resorting to it readily is an idea that is very generally accepted; even those west of the Mississippi have been doing it for a number of years.

Dr. Philip Coombs Knapp, Boston, said that it had not been his experience to encounter these varicosities of the spinal vessels outside of the cord. As to the skepticism expressed whether vascular pressure could produce the spinal cord symptoms, in some cases a comparatively small amount of fluid pressure will cause a good deal of disturbance in the cord. Dr. Knapp referred to a case he reported to the Society two or three years ago of a spinal cord tumor which was correctly diagnosticated and removed. The woman did perfectly well. About a year later she had a return of the symptoms almost exactly similar to those she had before and a recurrence of the growth was suspected, so after one or two lumbar punctures and a study of the case it was decided to go in again, which was done. The only thing discoverable was a moderate dilatation of the spinal meninges with fluid at the point of operation. There were no adhesions or spinal meningitis, the probe was passed as far as possible above and below. The fluid was allowed to drain away. She made a perfectly good recovery with a complete disappearance of all her old symptoms and travelled about, walking, dancing and doing all sorts of things. About a year later the symptoms again returned and being warned by his previous experience it seemed perfectly possible that repeated lumbar punctures ought to relieve her symptoms if due to an accumulation of fluid within the meninges. Repeated lumbar punctures were done without relief. Another operation was done and they found the same accumulation of fluid outside the cord and no indication as far as could be ascertained of any adhesions, and again there was a complete restitution of health. The woman came to see Dr. Knapp two or three months ago, walking perfectly well, the only thing was a slight Babinski in one foot which had persisted after all the operations. The explanation Dr. Knapp was unable to give. At the same time the relief was complete, the pressure from the accumulated fluid must have been slight and why the fluid accumulated thus he did not know. Why it did not come away with the lumbar puncture he did not know, but these are the facts at present.

Dr. I. Sidney Schwab, St. Louis, asked how we can be sure that the

changed physiological conditions present when the spinal canal is exposed
are not responsible for the dilatation of the vessels. The dilatation is
not uncommon. Dr. Schwab said he had seen this thing again and again
in exploratory operations on the cortex. As soon as the osteoplastic
flap is turned down that minute we see the enormous dilatation of the
vein. After while these veins again regain their normal caliber and what
appears to be first very pathological at the end of the operation appears
very much less so. Another point has been attracting attention, namely,
the curious effect upon spasticity of decompression operations upon the
cord and posterior root sections, and we have come to the conclusion that
there is such a thing as a spinal shock due to operative interference itself
which temporarily improves conditions of hypertonus in the muscle. Some
of the good effects of spinal cord decompression is due to spinal shock.

Dr. Elsberg, in closing, said that before one has the right to describe
a pathological condition, one must have a thorough knowledge of the
normal. This can be gained from large operative experiences and from
examinations of the cadaver. After having seen an enlarged spinal vein
in one case, Dr. Elsberg made a number of studies of the spinal vessels
on the cadaver and made notes of the appearance of the posterior spinal
vessels at his operations. In about 140 laminectomies, the last 97 without
mortality, these abnormalities were found only six times. The enlarge-
ments of the vessels were localized. There were no adhesions around
them. It was impossible that the enlargements of the vein were due to
general cyanosis or due to changes from opening the spinal canal. Why
should the enlargement have been so strictly localized to one part of one
vein? In none of the patients in which these enlarged vessels were found
was there an excess of cerebrospinal fluid and the appearance of the
vessel in each instance was absolutely abnormal. Dr. Schwab asks whether
this dilatation was not temporary. Dr. Elsberg did not think so; for
how could one understand a temporary enlargement of part of one of
the spinal veins? That these enlarged veins have some significance is
proven by the fact that when the veins surrounded nerve roots there were
localized nerve root symptoms. The walls of the vein were thickened.
In one instance there was a hyaline degeneration of the vessel wall and
the vein wall was much thicker than normal. It is another question
whether the improvement that followed the excision of the vein was due
to the removal of the enlarged part of the vein or to the decompressive
effect of the laminectomy. Surely the disappearance of root symptoms
in two of the patients must be connected with the removal of the enlarged
vessel which pressed upon the nerve root. In conclusion, Dr. Elsberg
stated that these localized enlargements of the posterior spinal veins must
be considered abnormal. There must be some connection between spinal
disease and the enlarged veins, although it is impossible to say whether
the enlargement of the vein is primary or secondary. That some patients
with these enlarged vessels are much improved or entirely relieved of
their spinal symptoms by laminectomy and excision of the enlarged vessel
is proven by the cases reported in the paper.

(To be continued)

NEW YORK NEUROLOGICAL SOCIETY

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The President, DR. WILLIAM M. LESZYNSKY, in the Chair

HEMORRHAGIC CEREBRAL GLIOMA WITH REPORT OF CASE

By W. M. Leszynsky, M.D., and S. F. Weitzner, M.D.

The patient was a girl of sixteen years. For seven months she had complained of left frontal and parietal headache, with an interval of three months of comparative comfort. The headache then became generalized, the attacks more severe and lasting for several days, being associated with vertigo and vomiting. Later, these symptoms became worse and continuous with occasional diplopia and failing vision, and amenorrhea during the last three months. On account of the headache, vomiting and vertigo she was admitted to the Lebanon Hospital, January 13, 1914. She was moaning and crying aloud continually on account of the severe headache, and was somnolent or stuporous most of the time. She could be easily aroused, and answered questions intelligently and without any speech disturbance. The pupils were moderately and equally dilated. Ocular motility was normal. Vision 20/200 in each eye, but not sustained. The form fields were contracted, but there was no hemianopsia. Bilateral papillitis between 6 and 7 D with retinal hemorrhages were present. Some tenderness and pain on pressure over both suboccipital regions were present, but no pain on percussion over the cranium. There was occasional rigidity of the neck. Facial innervation and tongue were found normal, as were the upper and lower extremities. Knee-jerks and Achilles reflex were absent. Thoracic and abdominal viscera showed no evidence of disease. Urine was normal. Blood pressure varied between 120 to 110 S. and 95 to 90 D. Serum Wassermann was negative. Blood count at three examinations showed a leucocytosis of 23,800 on January 14, 12,000 on January 19, and 18,000 on February 2. The x-ray picture of the skull showed nothing abnormal. A diagnosis of intracranial tumor was made, but its location was not determined. Right subtemporal decompression was done on January 23, ten days after her admission to the hospital. No improvement followed, and the condition of the eyegrounds remained unchanged. One week later (January 30) puncture of the corpus callosum was performed. Within twenty-four hours there was complete muscular relaxation, the headache was relieved, and she could be more easily aroused from the stuporous condition. Both pupils were widely dilated and fixed, conjunctivæ and scleræ injected, partial left exophthalmos and almost complete immobility of both eyeballs were present. In the left, power was limited to slight outward movement; in the right, to slight movement downward. The eyegrounds were the same. She remained in this condition until the time of death, which occurred February 22, 1914, three weeks after the last palliative operation.

Notes of Autopsy.—" There is a slight hernia of cerebral tissue (¼ inch) through the decompression opening; no sign of puncture of the corpus callosum; flattening of the convolutions of left parietal lobe; on both sides of calcarine fissure, on the mesial, as well as on the tentorial surface, the cortex has a rusty appearance; on the mesial surface there

is also some loss of cortical substance; on the adjacent part of the tentorium there is a coating of yellow-brown friable substance; on horizontal section of left hemisphere, just above the surface of the callosum, the cortical wall bounding the posterior horn internally is found thickened by friable material—the result of an old hemorrhage—crowding the posterior horn outward and forward; on its ventricular side the hemorrhagic mass is lined by ependyma; there is a small fresh clot in the left lateral ventricle, the result of recent oozing from the main hemorrhagic area; the ventricles are not distended, and contain very little fluid; microscopically the mass proves to be an infiltrating glioma with recent hemorrhage, involving principally the subcortical area in the left parieto-occipital region."

Dr. Joseph Byrne said that in view of the location of the tumor, viz., in the parieto-occipital region of the left hemisphere, he would like to ask if there were found, intra vitam, any evidences of deficiency in the reading center, or its association paths (optical aphasia). He would also like to know if there were any disturbances of the sense of smell or of stereognostic perception. The existence of hemianopsia and the presence or absence of the Wernicke hemiopic pupillary phenomenon would also, he thought, be relevant.

Dr. W. M. Leszynsky said the patient had been under his observation during the period of her stay in the hospital and she was almost always stuporous until the time of her death, thus it was impossible to make tests. Vision was 20/200; sense of smell was not tested; stereognostic sense was not affected. There was nothing to indicate the location of the tumor; it was supposed from the intensity of the choked discs and the intracranial pressure that the tumor might lie in the subtentorial region. At the time of the puncture of the corpus callosum there was very little fluid discharged. Decompression had failed. He assumed that it was one of the cases in which there was no internal hydrocephalus and that the pressure was rather due to the growth of the tumor itself. This fact was verified at autopsy when an infiltrating glioma was discovered and very little fluid was found in the ventricles. After the callosal puncture he assumed the additional symptoms were due to complicating hemorrhagic conditions. What was now seen in the specimen was not apparent at the autopsy. There was a friable hemorrhagic mass, permeating in different directions. Further examination of the brain showed that there was no hemorrhagic involvement of the corpora quadrigemina and that the symptoms were the result of pressure. There was no further microscopical examination made.

UNUSUAL CASE OF INFANTILE CEREBRAL HEMIPLEGIA

By T. S. Keyser, M.D.

The patient, the speaker said, was especially interesting in that the correct diagnosis would scarcely be considered from a clinical standpoint, but must be accepted from the definite reports obtained from various laboratory tests. The patient, a girl of 5½ years, was brought by her father, on January 11, to the out-patient department of the Neurological Institute, complaining of headache, vomiting and paralysis of the left arm and leg. The father had active pulmonary tuberculosis. He showed no physical signs of syphilis and a serum Wassermann, done by the board

of health, was negative. The mother, who was examined on a later date, was apparently in perfect health. There were two other healthy children in the family. The mother had had no miscarriages, and the father denied venereal disease. The patient had been unusually well up to the present illness, which began abruptly on Christmas day with headache, and in a short time, vomiting, the latter, from the father's description, being projectile in type. During the intervening three weeks she continued to complain of headache and to vomit several times daily. On January 9, the father noticed that she could not use the left hand as well as usual. The weakness progressed and extended rapidly, so that in three days the left arm and leg were completely paralyzed. At no time in the course of the illness was there any convulsion or evidence of mental symptoms. The temperature, taken 2 or 3 times a day during the onset, was normal throughout. Physical examination showed a well-nourished, normally developed, bright, intelligent child, showing no evidence of tuberculosis or stigmata of congenital syphilis. There was complete non-spastic paralysis of the left arm and leg and distinct weakness of the left facial muscles of the infranuclear type. Reflexes were all somewhat more active on the left than on the right. Babinski's and Hoffmann's signs were present on the left. Otherwise the physical examination was entirely negative. The history of headache and vomiting followed by the development of a hemiplegia of the cerebral type at once suggested the diagnosis of a brain tumor in the basal ganglia, involving the motor fibers of the internal capsule. The question was to determine the etiology of the process. The first conclusion would naturally be that it was a tuberculous process, first, because of the unquestionable history in the father, and secondly, because tuberculosis is by far the most frequent cause of brain tumors in children. The following facts, however, practically excluded this diagnosis: first, the rapid progress of the disease without fever; second, the entire absence of other evidences of tuberculosis; third, a negative von Pirquet; fourth, absence of tubercle bacilli in the spinal fluid; fifth, absence of infection in a guinea pig five weeks after injection. Polioencephalitis was also considered, but seemed untenable from the history. According to Strümpell, Medin and others, polioencephalitis was characterized especially by a sudden onset, with fever, convulsions and stupor, followed in one to five days by paralysis. According to the report on poliomyelitis by Drs. Peabody, Draper and Dochez of the Rockefeller Institute, but one case out of sixty-nine showed more than 50 cells in the cerebrospinal fluid and usually there were from 1 to 10 cells during the third week of the disease. In this case there were 180 cells. By the same process of exclusion it seemed possible to practically eliminate other conditions as thrombus, resulting from endocarditis, brain abscess, various forms of meningitis, glioma, sarcoma and carcinoma. It must be admitted that the true etiological factor was scarcely considered until the serum Wassermann was found to be positive. Owing to a possibility of error in the report it was repeated and the blood also sent to the board of health. Both were strongly positive. The spinal fluid gave the same result on two occasions. The diagnosis was further corroborated by the therapeutic results. The patient was given daily inunctions of mercury and small doses of potassium iodide. One intravenous salvarsan was given but other attempts were unsuccessful, due to the very small caliber of the veins. In a few days after treatment was begun the patient began to improve. The subjective symptoms soon disappeared entirely. The paralysis gradually improved, so that at the time of showing, patient was

able to move arm and leg quite well and the facial weakness was hard to detect. The spinal fluid cell count dropped from 180 cells on January 11 to 55 cells on February 5. It seemed almost incredible that a child could have congenital syphilis without the slightest evidence thereof, and yet suddenly develop such marked symptoms, indicating a marked activity of the spirochetes. Gummata were reported to be always secondary to acquired syphilis and therefore very rare in children. However, the serum Wassermann, recently done on the patient's mother, was found positive, although she showed no signs and had had no miscarriages. If the diagnosis of gumma, with endarteritis and more or less meningeal involvement were accepted, there was one other unusual feature. Luetic processes of the brain practically always occurred along the course of the meningeal arteries and therefore were either cortical or at the base. Yet in this case the lesion must unquestionably be in the region of the internal capsule, as it seemed incredible that a cortical lesion could be so extensive as to cause a complete hemiplegia without convulsions or mental symptoms.

Dr. Tilney said that it seemed that the etiology of this case was fairly well established. As to its pathology, the condition was probably what Head had described as the meningo-vascular type of syphilis. The location of the lesion would appear to be as Dr. Keyser had described it. There were no symptoms which justified the belief in a cortical localization, nor were there any thalamic symptoms. On the other hand, it was possible that a peduncular lesion might produce the disturbances observed in this case, the absence of oculomotor troubles would seem to rule out this possibility and thus, by exclusion, bring us back to a lesion which is capsular in its location.

Dr. Sachs said the case recalled some very old studies of his on infantile cerebral hemiplegia. The case was an unusual one. The specific origin was evidently established. These cases were rarely due to hereditary lues. He would like to ask if the onset were sudden.

Dr. Keyser said yes.

Dr. Sachs asked if the fundi were examined.

Dr. Keyser said yes; they were negative.

Dr. Sachs said these cases were parallel with the adult cases, with absence of convulsive seizures, widespread paralysis and slight general cerebral symptoms. The region of the internal capsule must be the site of the disease. That was rarer in children than the cortical site. He did not think this child had a gumma, but probably specific endarteritis, as in the adult, with the formation of a thrombus in the vicinity of the blood vessels supplying the internal capsule. This was parallel with some forms of adult apoplexy and that he assumed to be the explanation of the condition.

FURTHER STUDIES UPON THE USE OF MERCURIALIZED SERUM IN THE TREATMENT OF CEREBROSPINAL SYPHILIS

By Charles M. Byrnes, M.D., of Baltimore

The speaker gave first a brief review of his earliest studies upon this form of therapy. After a year's experience with the usual methods of treatment and with due acknowledgment of indebtedness to the work of Flexner and the later studies of Swift and Ellis with intraspinal therapy,

he felt that the direct introduction of a known antiluetic drug might be beneficial. Even the treatment of systemic lues with salvarsan alone was not entirely satisfactory, nor was salvarsanized serum. Mercury was an old and well-tried drug, but the problem was to determine the best form in which to administer it intraspinally and avoid discouraging results which had been obtained from the introduction of inorganic salts. It was believed that mercury circulated in the blood as an albuminate did and he had tried to make studies to determine the presence of mercury in the circulating blood. He chose 15 cases, divided in three groups of five; 5 were treated by inunctions; 5 with biniodide injections intramuscularly; 5 with bichloride by mouth, and all were carried to the point of mercurialization when specimens of blood and spinal fluid were obtained and sent to a chemist for determination of the mercurial content. In general those who received inunctions showed a larger percentage of mercury in the serum. In one case only was a minute quantity of mercury detected in the spinal fluid. It was possible then to secure a mild autogenous mercurialized serum. With this fact in mind he began to use exogenous mercurialized serum for intraspinal therapy. Salts of mercury formed a precipitate with proteid matter which was soluble in an excess of proteid, thus 18 c.c. of human serum would hold, in solution, 1 gr. bichloride as the albuminate of mercury. At first an extremely small dose of the prepared albuminate was used and gradually increased to $\frac{1}{50}$ gr. without harm, and later to $\frac{1}{25}$ gr. Further studies were made upon the toxicity of inorganic and organic salts of mercury. The minimal lethal dose for a dog of 10 kilos was $\frac{1}{2}$ gr. for both preparations, but intraspinously a slightly larger dose of the albuminate could be tolerated. Experiments upon the spirochetocidal effect of the albuminate were not yet completed. With *B. typhosus,* however, motility was lost after 2.5 minutes. No doubt the cultured spirochetes possessed greater resistance than those obtained from specific lesions. It was obvious that the best cases from which conclusions were to be deduced had mercurialized serum, only, intraspinously. In cases where the serum Wassermann was positive, however, the patient needed also intravenous treatment. It was difficult to say, however, in such cases whether the improvement was due to intravenous dosage or to the intraspinous treatment. He felt it would be advantageous to obtain a preparation which would contain a known quantity of a specific drug and minimize the disadvantages of salvarsan therapy when used intraspinously. Since the technic of preparation of arsenic was complicated and the serum must be used at once, and since Ogilvie's method and Ravaut's methods had certain disadvantages and the latter might cause alarming symptoms, he had undertaken this study. Mercurialized serum might be indefinitely kept and it was not necessary to have the patient's serum, since he had recently been using horse serum without harmful results. Mr. Campbell, president of the H. K. Mulford Co., had supplied him with ampules of the alien serum containing $\frac{1}{25}$ or $\frac{1}{50}$ gr. diluted with normal salt solution prepared according to Dr. Byrnes's directions. In administering the treatment he had employed the technic advised by Swift and Ellis in the use of salvarsanized serum. The spinal fluid pressure was reduced to 20 mm. and the contents of the ampule injected by gravity after having first been warmed to body temperature. Treatments might be repeated every week or ten days.

Summary and Results.—The fifteen cases recorded were obtained from the following sources: Sheppard and Enoch Pratt Hospital, 3; Dr.

Corson-White, of Philadelphia, 1; Dr. Rytina, of Baltimore, 2; Dr. Geraghty, of Baltimore, 1; personal, 8; of these fifteen cases, there were 8 tabes dorsalis; 3 cerebrospinal syphilis; 3 general paresis; 1 tabo paresis. All had shown some improvement and several were to be regarded as clinically well except for permanent organic changes. In all except one there had been an early and pronounced reduction in the cell count and globulin content of the spinal fluid. In three instances the Wassermann test showed a lowered percentage of fixation; in four cases it became negative; in one it changed from positive to doubtful. The remaining eight cases had been treated too recently to permit of trustworthy deductions. The greatest number of treatments which had been required to reduce a reduction in cell count and definite improvement in symptoms had been six, the average being three. Most cases had been treated within the past two months, and were still under observation. The treatment of syphilis could not be confined to any one form of therapy, and for this reason three methods of treatment had been adopted: (a) Salvarsan intravenously with salvarsanized serum plus mercury intraspinally; (b) salvarsan intravenously with mercurialized serum intraspinally the following day; (c) mercurialized serum alone.

Dr. Bernard Sachs said that ever since the publication of Dr. Byrnes's paper he had been very much interested in the mercurialized serum. The work was of such a character that all were deeply interested in the results. In his division at the Mt. Sinai Hospital, with Drs. Kaliski and Strauss, he was studying various forms of intraspinous medication in cases of paresis, tabes, and cerebrospinal lues. They had been making a fair trial with salvarsanized serum, Ravaut's method and Ogilvie's method. They had not yet tried Dr. Byrnes's method. A week ago, however, he instituted a ruling to give every fourth case mercurialized serum so that they would be able to judge the relative results. The form in which this was on the market was very gratifying. He had been using the patient's own serum. He would like to ask if Dr. Byrnes was not afraid of anaphylactic reactions. In their treatment they had seen improvement in a number of cases of paresis, and tabic patients had been made more comfortable, and there had been striking results in cerebrospinal lues. Paresis cases had not fared worse than with the old mercury treatment. After this discussion they found that more mercury got into the blood serum by inunction method, so that was an argument in favor of inunction. He had used this for years, then abandoned it, but it would seem as if this method would regain its use. Was the quantity of mercury obtained in the spinal fluid (if any) comparable with what they tried to inject? If so, were we gaining by injection? In regard to reactions following intraspinous medications, there were no disagreeable results as a rule, but every now and then one individual would get a disagreeable reaction. What that was due to it was difficult to say. In regard to cell count and globulin, he was not at all sure that the reduction of those was a certain indication of improvement in the general disease. It would seem as if the changes did not go pari passu with improvement in the clinical condition. He questioned, therefore, whether they were not paying more attention to that one point than it deserved, though he acknowledged that he aimed at it in his service. Some felt that mercury was less nocuous than salvarsan. Mercurialized serum was perhaps safer than salvarsan. He saw no advantage in retaining the salvarsanized serum. A definite quantity of salvarsan could be added to the serum to be injected.

Dr. Kaliski said the moment you introduced a definite quantity of organic salts into the spinal cord you got into trouble. Above 1–2 mm. patients got severe pains and bladder symptoms; in a few cases death resulted from larger quantities of salvarsan intraspinously. A regular transverse myelitis developed. The amount of salvarsan introduced by any form of intradural treatment must be infinitesimal if it were to do no harm. He had recently introduced saline solution into the spinal canal. In cases of paresis he had brought about reduction in the cytological count and even clinical improvement. One case of general paresis left the hospital in good shape. This had been his experience in many cases. Almost any injection into the canal would bring about a change in the cytological picture. The cell count should be done immediately after withdrawal of the fluid. If the fluid stood over night the cell count might drop from 100 to 40 or 50. Reduction in the Wassermann was less frequently found, but one case of paresis showed a definite reduction in the Wassermann obtained with introduction of saline. There was another factor: even lumbar puncture might bring about biological improvement and all citations must be taken with a grain of salt. It was difficult to understand what definite biological effect could be caused by incubation of the serum at body temperature and its subsequent inactivation at 56° C. In regard to intraspinous treatment, salvarsan dosage should be conservative, not over 1 to 2 mg. salvarsan or 3–5 mg. neosalvarsan. He did not believe withdrawal of large quantities of fluid to reduce pressure was an important point. Spinal fluid was very rapidly absorbed. Anaphylaxis might be caused by repeated injections which might sensitize the individual.

Dr. Tilney said it was gratifying to hear from Dr. Byrnes of this means of bringing mercury into play in the treatment of syphilis of the central nervous system. In medicating the cord or brain the drug should be brought in as close contact to the organ treated as possible and this, he thought, was best accomplished by the intraspinous method. Through the means suggested by Dr. Byrnes they had the opportunity of adding to and improving their intensive treatment of syphilis affecting the brain and cord by introducing mercury into the spinal canal. There was one thing, however, which they seemed to have almost uniformly overlooked in the treatment of tabes, paresis, tabo-paresis and syphilis of the central nervous system, namely, that they were dealing with a generalized syphilis. It had been shown that the great majority of tabetics coming to postmortem presented definite lesions of the heart, blood vessels, or the structures adnexal to the gastro-intestinal tract; in other words, a syphilitic process involving organs other than those of the central nervous system. The lesion of the heart might be parenchymatous or interstitial. There might be aortic insufficiency, aortic sclerosis or aneurysm. When we treated tabes or any other form of central nervous lues, we should not confine our efforts to the brain and cord alone, for if we did, we were neglecting to take into account the several locations of the specific organism in the body, and were permitting pathological processes to go untreated which might of themselves endanger the patient's life or give rise to obstacles which would seriously embarrass our routine antisyphilitic treatment of the nervous system. The problem, therefore, was how best to administer mercury or salvarsan, or both, in order to attain the twofold object, first, of reaching the nervous system, and, second, the other parts of the body which might be involved. Inunction apparently fur-

nished the best means of introducing mercury into the circulation. Serum from a patient treated by inunctions, further mercurialized, as Dr. Byrnes suggested, would seem to offer the best means of obtaining the double object in the treatment. With reference to salvarsan, he wished to take exception to the idea that salvarsan was to be replaced. This attitude, to his mind, was not logical. Certainly if salvarsan was introduced into the circulatory system, it permitted the entire body to get the benefit of the drug. The intraspinous injection of the salvarsanized serum brought the agent into the closest possible contact with the central nervous system. Here, therefore, the two objects for the treatment were also obtained. It would seem best to fortify further serum salvarsanized in this manner by Ogilvie's method, a procedure which recommended itself as more scientific because it permitted us to administer known doses of the drug. The preparation of mercurialized serum in ampules ready for use, was undoubtedly a great convenience to those who were constantly engaged in the technic of intraspinous treatment, but he doubted very much the wisdom of making the treatment so convenient and easy that it might become a routine procedure for the general practitioner. Intraspinous medication was a hospital method and should be surrounded by all the possible restrictions which would make it safe and insure against unnecessary accident. One word as to the spirochetocidal effect of mercury must be added. He noticed that Dr. Byrnes employed for his tests in this work strains furnished him by Noguchi which had been grown in vitro. Now it was interesting to note that the spirochetes grown in vitro agglutinated readily to immune serum, whereas the organism taken from the rabbit's testis in an acute process did not agglutinate when so treated. Undoubtedly there must be a difference in these two strains of the spirochete and the spirochetocidal effects of mercury could not be judged by its action upon cultures grown in vitro. Personally, he felt indebted to Dr. Byrnes and his argument in favor of using mercurialized serum intraspinously seemed to him sound both anatomically and physiologically.

Dr. W. M. Leszynsky said it seemed to him an open question as to whether benefit was derived from salvarsan or salvarsanized serum in general paresis. We had learned that lumbar puncture would change the cell count, and had heard also that there was a normal fluctuation, so it was difficult to judge as to the character of the biological reactions, as influenced by the serum.

Dr. Byrnes said in regard to Dr. Sachs's question as to anaphylaxis, he had not observed anaphylaxis in using the alien serum. There might be some question as to whether one was really introducing serum. In the ampule he had shown there was only 1 c.c. of serum, the rest was salt solution. Furthermore, the serum might be so changed by the addition of mercury that its anaphylactic properties were destroyed. It was not known, however, in what conditions the ions existed in organic mercury, but he felt there need be no special fear of anaphylaxis. Dr. Sachs had misunderstood him in regard to the mercury content of the spinal fluid. The patient's serum showed slightly higher content with inunctions, and in one case only of fifteen months a slight trace of mercury was detected in the spinal fluid. In regard to reactions, he agreed that in some cases reaction might be severe. The reduction of the cell count was interesting. He was familiar with the reference of Dr. Leszynsky. The cell count also varied with any one puncture if the count were made from the first or last portion of the fluid obtained; and this variation might be

as much as fifteen cells. He agreed with Dr. Sachs as to the clinical symptoms and the reduction of the Wassermann. In answer to Dr. Kaliski and his statement that the administration of saline had changed the Wassermann, he would like to know the spinal fluid pressure before and after administration and the interval that elapsed between observations.

Dr. Kaliski said the Wassermann was taken before the introduction of the drug. At least a week elapsed between tests. It was not a dilution, in other words. He did not remember about the pressure.

Dr. Byrnes, in answer to Dr. Sachs, stated that he had recorded no bad results.

CHICAGO NEUROLOGICAL SOCIETY

February 25, 1915

The President, Dr. H. Douglas Singer, in the Chair

TRIBUTE TO DR. D'ORSAY HECHT

Dr. Archibald Church said he was privileged to say a few words in reference to their colleague, friend, and fellow-worker, Dr. D'Orsay Hecht. During the larger part of his professional residence in Chicago Dr. Church was intimately associated with him. He did not propose to indulge in eulogies. In this instance the cynical aphorism of "nil nisi" regarding the dead is accurately applicable without reservation to the real facts of a life so untimely ended.

Dr. Hecht's first impression upon him was one of cleanliness. He was cleanly in his dress—fastidiously so. At first it gave Dr. Church an idea that he was superficial, but he found that the same painstaking care that he exercised in the selection and wearing of his outer garments, he exercised in every endeavor and duty, and all his mental habiliments were equally clean. Very shortly he came to recognize that if anything were asked of Hecht it would be done. He was entirely dependable.

In his early writings there was a wordy excess that he very promptly overcame. In some of his later articles there is a terseness associated with directness that is highly satisfactory. If one turns to the papers that he prepared upon the injection of the fifth nerve branches and the treatment of the sciatic, he will find a lucid description of the technique and a practical guidance for the maneuvers that are unequalled in any other publication.

As a speaker and teacher he quickly acquired a facility of the highest order. On suitable occasions wit and humor were his ready servants. His ideas not only were formulated clearly but powerfully and logically presented.

With him his profession was in very fact a calling. To its highest ideals he was deeply devoted. In it he had already accomplished much, though he only stood upon the threshold of a career that promised the loftiest rewards and many eminent achievements.

Dr. Church had seen Dr. Hecht under varying circumstances—circumstances that were agreeable to him, circumstances that were trying to him. He had never known him to lose his poise or to take advantage in any fashion that was not straightforward. He was cleanly throughout.

As a physician he had extraordinarily good qualities. He did his own thinking. He listened to others. He read all but formed his own opinions. He held his patients with a peculiar grip, not so much by personal attachment as by a mutual regard and respect that were unusual. Dealing as he did, and as the rest of us do, with a self-centered, egotistical and carping class of patients, in such gossip as has been forced upon all, Dr. Church had never heard any complaint of his personal or professional treatment of any patient.

Dr. Hecht had a nobility about him that was clearly manifest in the last days of his life. Although Dr. Church came into intimate contact with him and was aware of his ill health, and only a short time before his death arranged for a cessation of his school work in order that he might take a rest, he never complained to him that there was anything of a grave nature in his condition. And yet Dr. Church had since learned that for a long time he was advised that he stood in danger. He cheerfully met this danger without parading it, and with an optimism and a courage that are worthy of emulation. Dr. Church felt grateful to have known D'Orsay Hecht and entered deeply into the bereavement of those who were related to him. He requested the Society to rise for a solemn moment and stand in silence, as a tribute to this noble young soul who has gone out ahead of them.

(The Society rose as requested.)

TREATMENT OF PARESIS BY ENDO-LUMBAR INJECTION OF NEO-SALVARSAN

By Charles F. Read, M.D.

Twenty cases of well-advanced paresis in male subjects were treated with 123 endo-lumbar injections of neo-salvarsan, in doses ranging from .003 to .006 and .008 gram, diluted in at least 10 cc. of the patient's own fluid and given at intervals of two weeks. A number of patients received as high as ten doses. During the treatment, three patients died, but two of these were in the final stages of the disease when treatment was instituted and death cannot be fairly attributed to interference. One case, already slightly spastic when received, became quite intensely spastic and died after about three months' treatment. Three patients suffered incontinence of urine, apparently as a result of dosages of .006 gram. A few complained of weakness, headache and leg pains from time to time following treatments. A few had a slight rise of temperature for a short time following some treatments. One case of tabo-paresis developed a Charcot's joint during treatment. One suffered convulsions immediately after treatment, but had had other convulsions not connected with treatment. The Wassermann upon the blood serum in nine cases remained strongly positive. In one case it became negative and in another case it remained negative. The others were not tested. One negative and one faintly positive Wassermann in the spinal fluid became strongly positive.

A few favorable results were noted. In one case a very good remission began after a few treatments, but the spinal fluid findings are still positive. Others are markedly improved but are still very evidently paretics. A number showed improved physical health. In three cases the Wassermann upon the spinal fluid became weaker.

Upon the basis of the above results, it seems fair to conclude that endo-lumbar treatment of paresis with neo-salvarsan in small dosages (.003) is without effect, and that when the dose is increased, the results are extremely apt to be injurious. The use of neo-salvarsan in this manner is to be discouraged.

Dr. Lewis J. Pollock said that the necessity for the introduction of salvarsan and other drugs directly into the subdural space has developed because of two conditions. First, because the administration of salvarsan through other routes is not attended by very striking or permanent results in the quartan stage of syphilis, and second, because certain substances introduced intravenously into experimental animals have not been found in the brain or cerebrospinal fluid.

The experiments tending to prove the latter contention are not conclusive, and those dealing with the injection of dye stuffs are not convincing. Inasmuch as we know, following the work of Ehrlich, Bethe and others, that when methylene blue is injected into the body, it is reduced into a colorless leucobase, and can not be demonstrated in the brain by ocular methods, until the brain is exposed to the air and the dye reoxidized, it follows that a similar change may occur with many substances. Although it is true that when a solution of trypan blue is injected intravenously, it can not be demonstrated in the brain by ocular methods, it is also true that it can not be found in other organs as the testicle, epidydimus, ovary, suprarenal and pancreas, as shown by Bouffard and others. It seemed to the speaker that the failure of demonstration of the presence of such substances in the brain does not rest upon either a filtering action of the choroid plexus, or upon any peculiar and selective impermeability of the cerebral vessels. It is much more likely that the agent injected is not neurotropic.

Dr. Read said that the treatment was undertaken merely with the idea of trying out one special mode of procedure, and it has proved unsuccessful.

GALVANOMETRIC STUDIES OF THE CEREBELLAR FUNCTION

By I. Leon Meyers, M.D.

The speaker reported his results carried out at the University of Chicago. After analyzing the numerous symptoms that have from time to time been ascribed to lesions of the cerebellum, he stated that according to his observations the symptoms that are essentially cerebellar in origin are the ataxia and the tremor, and that such symptoms as forced movements, nystagmus and conjugate deviation of the eyes so frequently observed after experimental lesions of the cerebellum are due to concomitant lesions of the vestibular complex and its oculo-motor connections, as shown by Muskens; also that pure cerebellar lesions do not give rise to the disturbances of sensations or true paralysis contrary to the observations of Risien Russell and others. He then reported the results of a series of galvanometric studies which he had carried out with the object of ascertaining the mechanism of the cerebellar function. He stated that the action or excitatory current, propagated along a peripheral nerve upon stimulation of the contralateral motor area of the cerebrum, manifests itself not only in a negative variation as demonstrated by Gotch and Horsley, but also in a state of negativity with relation to the corresponding resting

nerve on the other side. On connecting the two sciatic nerves of a cat by means of non-polarizable electros with the galvanometer he thus found that the mere exposure of, *e. g.*, the right motor area of the cerebrum and the application of normal salt solution at 38° C. to its surface was sufficient to bring about a state of negativity in the left sciatic with relation to the right, so that each time the galvanometric circuit was closed a deflection occurred which indicated this difference in the electrical potential on the two sides. This difference he observed to become gradually diminished with the subsidence of the cortical irritation, but was promptly restored upon faradic stimulation of the hind-limb area. Stimulation of the same area on the left side invariably changed the direction of the deflection, the right sciatic becoming negative to the left. A similar difference in the electrical potential of the two sides he found to follow unilateral oblation of the cerebellum, so that the nerves, such as the ulnar or sciatic on the side of the lesion were invariably negative to the corresponding nerves of the healthy side, from which he concluded that the former were in a state of functional hyper-activity as a result of the cerebellar lesion. The galvanometric studies had been made two or three weeks after the cerebellar operation so as to exclude the possibility of the phenomenon being an irritative effect. The studies had been carried out in all upon six cats, three with the right lateral lobe of the cerebellum removed and three with the left. In each animal so studied practically an entire lateral lobe had been removed, as proved subsequently by autopsy, and the wound healed by first intention.

The state of negativity on the side of the lesion he found to be abolished by the additional removal of the contralateral motor area of the cerebrum, but not by the removal of other portions of it, although the destruction of tissue in the latter instance was very extensive. These last experiments he carried out in three stages as follows: He first removed a portion of the cerebrum, two weeks later he removed the contralateral hemisphere of the cerebellum and made his galvanometric studies two weeks after the latter operation.

He concluded from these observations that the cerebellum has no direct effect upon the periphery, contrary to the generally accepted theories, that it exerts its effect upon the motor area of the cerebrum, and possibly also the para-cerebellar nuclei, this effect being inhibitory or regulatory in character. Cerebellar coördination is therefore only indirectly cerebellar, it is primarily a cerebral effect, an expression of cerebral activity, when controlled and regulated by the cerebellum.

As to the tremor, he noticed it to be marked even after the removal of the motor area of the cerebrum in addition to that of the opposite lateral lobe of the cerebellum, tending to show that it is not due to hyperactivity of the cerebrum as proposed by Gordon Holmes and that its cause must be sought elsewhere.

Dr. Archibald Church thought the paper was pregnant with suggestions. In discussing the matter with Dr. Meyers he had asked him if he had found a relation of the cerebellar surface or contents to the extremities, similar to that which exists between the motor cerebral cortex areas and the limbs, but he said nothing of that sort had appeared in his experiments.

Recently, Rothmann has claimed that certain cerebellar areas are definitely related to the head, trunk and extremities. From a clinical standpoint it would be highly gratifying if these contentions could be substantiated.

Dr. Meyers, referring to Dr. Singer's remark to the effect that Jackson's idea was that the cerebellum has a tonic effect, the speaker had mentioned that in his paper. Jackson based his contention chiefly upon cases of cerebellar tumors, with tetanus-like seizures, which he had seen. Horsley supported his view by experimental observations. He showed that after injections of absinthe while the animal was in a state of convulsions, on section of the mid-brain, the clonic convulsions became tonic, showing that cerebellum is tonic in its effect. His personal belief is that the tonic effect exerted by the cerebellum is not a cerebellar effect, but that it has its origin in the para-cerebellar nuclei.

It would be well to remember that in lower animals the para-cerebellar nuclei are directly connected with the nucleus fastigii or nucleus tecti. As mentioned in the paper, it has been shown that the para-cerebellar nuclei are the source of decerebrate rigidity.

With reference to the question of localization, he performed the described operation on a number of animals, and never was convinced that the cerebellum was localized in its action. If only a small portion of the cerebellum was removed, the disturbances were slight and indistinct all over. If an entire lateral lobe—the disturbances were marked.

With regard to the stimulation experiments: it is a fact that one can not produce movements with current of moderate strength. The movements have been obtained by Ferrier, Pruss and others with very strong currents only. It must not be forgotten that stimulation with a powerful current in a temporo-sphenoidal lobe will give movements, although that is not a motor area.

A current is transmitted by preference along the neuron tract, but if that route is not open, by another route, and movements are produced by stimulation of other parts.

PROGRESSIVE MUSCULAR ATROPHY, ACUTE FORM

By Albert B. Yudelson, M.D.

After reviewing the literature on the subject, setting forth the confusion in the classification of the atrophies occurring in earlier writings, and referring to the more recent literature which establishes the pathogenesis and pathological anatomy of progressive muscular atrophy, the essayist stated that it has been proven by numerous observers, Gowers among them, that all the varieties of atrophy presenting neuritic lesions are one and the same. The variability in the clinical picture depending on the location of the lesion and the extent of the involvement.

The changeability in the reflex and electrical findings, too, is dependent on the tract in the cord involved. The conflicting reflex findings are clinical expressions of the pathological situation. The upper and the lower motor neurons being involved at various levels in the same case will show a spastic paralysis in one group of muscles and a flaccid paralysis in another, an increase in the reflex activity in one limb and a diminution or absence in the other. Frequently, too, an exaggerated reflex, due to a lesion in the pyramidal tract, will disappear as a result of the disease process progressively involving the anterior horn levels. The slowness of the progress in the development of the atrophies, the essayist insisted, was largely responsible for the failure on the part of the early observers

to take in the full view of the clinical picture from beginning to end. He exhibited a number of photographs of a case in which the symptoms and the atrophies progressed very rapidly. He claimed that in following up the rapid progress in such a case one can see the unity that pervades throughout the entire progress in these cases.

Dr. Yudelson read the following report of a case:

V. B.—woman, colored, aged 59 years.

Family history, negative. Personal history: Pneumonia at five years, measles at ten. Menstruation at nine, married at twelve, gave birth to three healthy children at five-year intervals. Menopause at forty years. Ten years ago she had articular rheumatism. Recovery after eleven weeks.

Present illness: " I have been well all my life, up to eight or nine weeks ago, doing my housework, sewing, mending and crocheting Battenberg for a living. Last February (1914) I felt slight aches in my right arm. A week later also in the left. Not in the joints, but in the flesh between the joints. They also felt very weak. About a week later my limbs got weak so I could not get about. I had no pain in my legs, but they got tired out quickly. I had no chills, no vomiting.

" On March 16 I could not raise my right arm at all. I could raise my left hand to my face, but could not feed myself or lift anything.

" All this time I noticed my flesh shrinking away almost over night. I first lost the use of my thumbs so I could not pick up anything. By the end of March I could not walk at all. In trying to stand up my limbs would either bend under me or fall apart. They got so thin they could not support my weight.

" I was brought to the hospital on a stretcher. I have no headaches. I sleep well. Bowels good."

Patient entered Provident Hospital April 25, 1914.

Examination: Chest and viscera negative. Pulse 88. Temp. 98.4. Resp. 22. From the shoulders down the musculature, particularly of the extremities, was very atrophic. No atrophy in muscles of face or neck. Patient lay with limbs in demi-flexion. Scoliosis with convexity to the right. Slight edema about left elbow joint.

Sensibility to touch, pain and temperature everywhere normal in all their modes. Muscle and joint sense, coördination intact. No rachidian pain on percussion or pressure.

No cranial nerve involvement. No mental changes. No sphincteric disturbances.

In all the extremities voluntary motion was very limited. Patient could bring hands up only to her breasts. She had to be fed. She could not extend arms or legs. Flexion was better than extension; pronation and adduction better than supination and abduction.

Thenar and hypothenar eminences flattened. Interossii and lumbricales atrophied. Thumbs were on a plane with the fingers, the typical " ape hand." Wings of scapuli flare away from the body; skin everywhere falling into folds. Atrophy greater in extensors than in flexors. Paralysis corresponded to atrophy.

All the superficial reflexes were present. The deep reflexes were considerably reduced; more so on the left side. No tremors, no rigidity anywhere. Some fibrillary twitching upon extreme extension of left arm.

Electrically there was a quantitative reduction to both currents. No evidence of degeneration.

Laboratory Findings.—Urine: Acid. Sp. gr. 1011. No sugar. A strong

trace of albumin. A few pus cells. Blood: R. B. C. 4,000,000. W. B. C. 23,600. Polymorph. 90 per cent. Large Mon. 3 per cent. Small Mon. 5 per cent. Transition. 2 per cent. Wassermann negative. Blood cultures in bouillon, no growth. Subsequent blood examinations showed a leukocytosis of 18,000. Spinal fluid: cells 6, negative to all other tests.

June 10, 1914, knee jerk on right appeared increased. In less than one month after that all deep reflexes excepting the Achilles on left became brisk. August 4, ankle clonus and suggestion of Babinski toe phenomenon present on right side. With the exception of the left leg which remained flaccid and the Achilles finally lost, spasticity increased everywhere.

Patient left for Minnesota, October 13, 1914, with spastic paralysis of the two upper and right lower extremities. No cortical or bulbar changes. No nystagmus. No sphincteric involvement. No sensory disorders. No contractures.

This case shows:

1. That the atrophies were due to some infection.

2. That the involvement was purely motor.

3. That, though limited to the motor tracts, no respect was shown for levels.

4. That the outer manifestations of spasticity due to upper motor neuron disease are evident only as long as the integrity of the lower motor neuron is preserved.

5. That the acute onset and rapid progress of the disease preclude sectional classification.

6. That owing to the slowness of the progress and the not infrequent remissions occurring in these cases, early observers were led to regard the various manifestations of the atrophies as distinct types and morbid entities.

Dr. Julius Grinker asked the essayist why he called the case acute.

Dr. Yudelson said simply because from the onset, in February, until April, when he first saw the case, the entire picture was completed; whereas in the average case of this kind it takes years to develop. He also differentiated it from the Landry type of ascending paralysis; from pachymeningitis and other acute forms of spinal atrophies.

Dr. W. H. Holmes asked Dr. Yudelson if the patient had a stomatitis or diarrhea at any time.

Dr. Yudelson replied that excepting a healed sore from a plaster applied to the patient's back some time ago she showed no evidence of peripheral infection. There was no diarrhea. The patient did not run a temperature during her entire stay in the hospital.

Translations

THE DREAM PROBLEM[1]

By Dr. A. E. Maeder

ZÜRICH.

(Translated by Drs. Frank Mead Hallock and Smith Ely Jelliffe.)

(Continued from page 713)

"When I thus sat beside him, sewing and ironing, I knew very well that I really did not belong there any more; that as city dweller I had other things to do, but I was always off on a holiday taking my summer vacation, and keeping out at my master's. I was often very uncomfortable and regretted the loss of time in which I would have known well how to employ myself better and more usefully. Sometimes I had to endure censure from the master tailor, if something had not turned out the correct cut or measure but of any weekly payments there was never even mention. Often when I sat with bent back in the dark workshop, I made up my mind to give my master notice and to quit. Once I even did so, but the master took no notice and soon I was sitting there again, sewing. How happy I was to wake up after such tedious hours, and then I resolved that if this insistent dream should come again to throw it off with energy, and to call out aloud, 'It is only a play—I lie in bed and wish to sleep.' Yet the next night I sat again in the tailor's workshop. So it continued for years with uncanny regularity. Then once, when the master and I were at the house of the peasant, where I entered upon my apprenticeship, my master showed himself especially dissatisfied with my work. 'I would like to know where your mind goes to,' said he, looking at me angrily. I thought the most sensible thing to do would be to get up now and tell the master that I was only helping him from kindness and then go

[1] A paper read at the Congress of the Psychoanalytical Society at Munich, September, 1913.

away. But I did not do it. I calmly submitted when the master
took an apprentice and told me to make room for him on the
bench. I wriggled into the corner and sewed. On the same day
another lad started to learn the trade, and behold, it was the
Bohemian who nineteen years ago worked for us and who at
that time had fallen into the brook, on his way from the inn.
When he wished to sit down there was no room. I looked ques-
tioningly at the master, and he said to me: ' You have no talent
for tailoring, you can go, you are dismissed.' I was so fright-
ened by this that I awoke. The dawn was entering the win-
dows of my cozy home. Objects of art surrounded me, in my
well stocked bookcase eternal Homer was awaiting me, gigantic
Dante, incomparable Shakespeare, glorious Goethe, the splendid
ones, all the immortals. From the next room sounded the clear,
little voices of the awakening children, chattering with their
mother. I felt as if I had just newly recovered this idylically
sweet life of mine—peaceful, poetic, spiritualized, in which so
often I had realized human happiness to the uttermost. Yet I
resented it that I had not anticipated my master's dismissal of
me, but had been sent off by him. And how strange it is that
since that night, when my master dismissed me, I enjoy rest; I
dream no longer of my tailoring days that lie in the distant past,
which in their way were so jolly in their simplicity, without de-
mands, and yet threw this long shadow on the later years of my
life."

In this series of a poet's dreams (who in his younger years
had once been a tailor's apprentice) it is difficult to recognize
the wish fulfilment. All he enjoys lies in his waking life, whilst
the dream seems to drag along the ghostly shadow of a joyless
existence which the dreamer at last overcame. Some dreams of
a similar kind have enabled me to give some explanation of this
sort of dream. As a young doctor I worked for a long time in a
chemical institute, without achieving anything much in the arts
there to be acquired and therefore, when awake, never like to
think of this unfruitful and rather humiliating episode of my
student days. Yet it has become a recurrent dream with me,
that I am working in the laboratory and making analyses; all
sorts of things happen and so on—these dreams are as uncom-
fortable as dreams of examinations and never very clear. In-

terpreting one of these dreams, my attention was finally drawn
to the word "analysis" and this gave me the key to the under-
standing of the dream. Since then, sure enough, I have become
an analyst, I make analyses that receive praise—that is, psycho-
analyses! I understood now that when in the waking life I am
proud of analyses of this sort, and would like to boast how much
success I have had, then, by night, the dream holds up before
me those other unsuccessful analyses of which I would have no
reason to be proud ; these are punishment dreams of the upstart,
like that of the tailor apprentice who has become a feted poet.

But how is it possible for this sort of dream to place itself
in the conflict between the pride of the parvenu and the self
criticism the latter uses, and to take for its contents a sensible
warning instead of an unpermissible wish fulfilment? I have
already said that the answer to this question causes difficulties.
We may assume that an overbearing ambition forms the founda-
tion of the dream. But in place of ambition the repression
and humiliation of the ambition has got into the dream. I may
remind you that there are masochistic tendencies in the psychic
life, to which one might ascribe such an inversion. But closer
examination of some of these dreams gives further revela-
tion. In the vague side issues of one of my laboratory dreams,
I was just at the phase of the darkest and most unsuccessful
year of my career as a physician. I had as yet no standing, and
did not know how to make ends meet ; but just then it was clear
that I might have the choice of several women whom I could
have married! So I was young again in the dream, and above
all, she was young again, the wife who had shared with me all
these hard years. This betrayed the unconscious dream agent
as being one of the insistent gnawing wishes of the aging man.
The fight between vanity and self criticism, waged in other psychic
layers, had decided the dream content, but only the deeper rooted
wish for youth had made it possible as a dream. Often, awake,
we say to ourselves "Everything is all right as it is to-day, and
those were hard times, but it was fine, at that time ; you were still
young then!"

According to the suggested interpretation of Freud, the mean-
ing of the dream would be about this : " I wish I were still young,
as I was in the days when I was a tailor apprentice." When I

ask myself if this interpretation explains the clinical findings, namely the liberating effect of the last dream of the series, I must answer no. For if I, in dreams, long intensely for my youth, I fail to see why the awakening and the making sure of my later age and present conditions, makes me so happy, as is actually the case. A second question suggests itself: Why does only the last dream of the series (when the tailor dismisses the youth) act in a manner so as to set free the dreamer and sets him free once for all?

For this dream I make the following suggestion: By his own efforts Rosegger has worked himself up to a high position in life. This has made him proud and vain, two qualities which easily disturb mankind, since they cause a man to suffer in the presence of superiors and place him in a parvenu position among the lowly, this not being compatible with a fine sensibility. The two qualities poison the psyche. Deep down there takes place in the sensitive poet a gradual elaboration, a development of the moral personality. Rosegger's ideal conception of life is well known and justifies my supposition. Accident, in the last few days, has placed in my hands a private correspondence between the poet and a literary friend, which treats of just this point— Rosegger's pride and vanity—which was to me an unexpected confirmation of the solution just suggested. The long series of tormenting dreams shows us the development of the psychic process which ends in a deep but effective humiliation of the dreamer. After long working for nothing for this master, he is censured unjustly; a drunkard and a do-nothing is even preferred to him, and finally he is sent away. He is "made strange" (dismissed). This being sent away (being dismissed) symbolizes, in my opinion, the overcoming of the pride and vanity of the upstart. After long struggles the poet is set free. (We know that the dreams persecuted him for years.) Since his dismissal, in the last dream, he may now enjoy, rightfully but humbly, what he has won by his own exertions—he has won for himself the moral justification to do so.

Rosegger's dream is then, for me, an autosymbolic expression of the development of the moral personality of the poet. It is well adapted to demonstrate clearly the teleological side of psychic phenomena. Freud's interpretation refers to a justifiable wish

of the mature, aging man "to be young again." This conception contains only the regressive side of the phenomena, for such a wish is a regression. But dreams also contain a progressive side, which is for me the more important one. We want something more of life than the longing for the past; the poet wishes to make something of the life that still remains to him. The work of his unconscious helps him in this and expresses his progressive as well as his regressive longings. On this point I shall speak more freely after the analysis of the so-called nurse's dream.

Types of Dreams

This part of my paper, which deals with the manifest dream content, I shall close with a short, sketchy classification of dream categories. You remember the formula that the dream is an autosymbolic phenomenon. Two extreme kinds may be distinguished—between them may be found all degrees of approximations. Among the first kind we may recognize in the dream the representation of an intensely active condition of the psyche. The action is lively or direct, energetic; or the words uttered are the clear expression of a resolve, etc. This quality may be made use of in the prognosis, be it in the sense of an intensely progressive achievement or of an active resistance. In the second kind of dream the static factor dominates. Indifference, indecision, vagueness, awkwardness, doubt, stagnation or fixation reveal themselves already in the manifest dream content. Such dreams are apt to occur during times of lazy, passive resistance or in the incubation period. Also they have a certain prognostic meaning for the contemporary phase.

I ask myself if there may not be a third category of dreams, to which another new element strongly contributes—the prospective outlook; dreams which are not so much an actual picture of the situation but rather a vision of the future striven for, and potentiality contained in the individual. I must avoid being misunderstood here; of course we are here dealing only with a realization of a latent power, without taking into account outside obstacles. We are not dealing with a prophetic vision but with a foresight, with a clew to the direction which is suited to the reaction and strength of the patient in question. In the course of this paper I shall come to speak of a certain individual reaction

formula, of a sort of constant which permits of the establishment of a prognosis, up to a certain point. I assume this to be the true kernel of the faith in prophetic dreams. Adler, who has as we know given a definite conception of the psyche, takes a similar view, and he has, as is well known, given a conception of the psyche that is very final and very one-sided. I myself have reasons to assume that certain so-called childhood memories give a symbolic outlook on later important experiences in life, this taking place because of a reaction formula already developed in the child. Two childhood memories of the artist Benvenuto Cellini first demonstrated this idea to me. I shall discuss this in detail in my book already announced, the " Process of Cure." This contains an analysis of the Florentine artist. I shall try in the analysis of the Prometheus myth to carry this idea from the life of the individual over into that of a people. Just here is an opportunity to mention that Freud in his beautiful Leonardo analysis has already formulated this same idea, although his conception is different from mine.

Prospective dreams, of which we are speaking, do not appear arbitrarily at any moment in life, but only at the suitable moment. In two papers I have already pointed out the significance of the first dream in the treatment.[4] Steckel and perhaps others of whom I cannot think just now have also done this. These first dreams frequently (always) belong to this last category. This whole field is still open to research as all else of which I have spoken to-day. A fine rich work is still open before all of us!

(To be continued)

[4] Zentralblatt, 1st year, p. 348, and in " On the Function of the Dream," Jahrbuch, Vol. 4.

Periscope

Progressive Lenticular Degeneration. W. B. Cadwalader. (Journal
A. M. A., Jan. 30, 1915.)

The author reports a case of progressive lenticular degeneration,
confirmed by necropsy, the first one, he thinks, in American literature
thus completely reported. During the lifetime of the patient no definite
diagnosis had been made. The first Wassermann was slightly positive,
but the subsequent ones negative and lenticular disease had not been
suspected until the postmortem. The patient, according to the imper-
fect history obtained, had been subject to frequent recurring attacks of
mental depression and on admission to the hospital her mentality was
distinctly impaired, memory largely affected, and she was listless, lethar-
gic, and at times emotional. From the very beginning there was a dis-
tinct tendency to spasticity of all the extremities, and of the face, but
the well marked tremor, limited at first almost solely to the right upper
limb and the muscles of the face gradually affected the entire muscula-
ture, though it never became noticeable except on voluntary movement.
The earlier spasticity probably masked the tremor to some extent. The
onset of this case was not unlike that of Wilson (Brain, 1912, p. 316).
There was nothing indicating a toxemic condition—no fever, malaise,
etc. Aside from the first slightly positive Wassermann there were no
clinical evidences of syphilis or microscopic evidences of lues in the
brain. The low power of the microscope showed a number of small
irregular scattered areas of softening in the lenticular nuclei of both
sides, the largest being about the size of the head of a pin, and these
were more numerous in the putamen than in the globus pallidus. Al-
though there was increase of the neuroglia, the large nerve cells of the
putamen seemed less numerous than normal. There was nothing
specially abnormal mentioned elsewhere.

Mauthner's Cell. Geo. W. Bartelmez. (Jour. of Comp. Neurology,
Vol. 25, No. 1, pp. 115–116.)

The nucleus motorius tegmenti may be divided into cell groups which
correspond to the various motor nuclei of the medulla oblongata and the
relations with these nuclei represent the primitive connections of the
groups.

The groups have secondarily acquired relations with the primary
sensory nuclei which lie at the same transverse levels and have differ-
entiated accordingly.

This connection is interpreted as an adaptation for rapid reflexes
between the sensory centers and motor centers of the somatic musculature.

The axones of the larger cells of the nucleus motorius tegmenti com-
prise the greater part of that portion of the fasciculus longitudinalis
medialis which goes to the spinal cord.

The motor tegmental nucleus is best developed in the region of the acoustico-lateral nuclei.

Certain cells here have migrated toward the acoustico-lateral decussation, from which they receive collateral fibers, and they have increased in size. They are homologized with the Müller's cells of cyclostomes.

Mauthner's cell is interpreted as a cell of the same type as the Müller's cells which has gone much further in its differentiation as a result of establishing a direct connection with the VIIIth root fibers. It is the association cell of three-neurone reflexes having short latent periods. The perikaryon and dendrites are gigantic in their proportions but the nucleus is not correspondingly large.

At least twelve different types of fibers have endings in the periceliular net of Mauthner's cell. One portion of the pericellular net is particularly highly developed. It is termed the axone cap and is primarily an acoustico-lateral connection.

There is clear evidence that the different dendrites of Mauthner's cell have different types of connections. The endings of the VIIIth root fibers upon the lateral dendrite in Ameiurus are well adapted for a study of the nature of the synapse. The two plasma membranes are seen in contact. The cell affords an excellent material for the study of the structure of the cytoplasm.

JELLIFFE.

THE MEDULLA OBLONGATA OF MAMMALS. C. J. Herrick and G. E. Coghill. (Jour. of Comparative Neurology, Vol. 25, No. 1, pp. 65–85.)

The first response which the *Amblystoma* embryo can make to external stimulation of the skin is a simple avoiding reaction, turning the head away from the side touched. This is soon followed by an S-shaped reaction of the whole body, and this in turn by a simple swimming reaction. In the earliest stages of all of these reactions the afferent nervous impulse is transmitted through a chain of several neurones to the upper end of the spiral cord, thence across the ventral commissure into a descending efferent or motor tract, which is also composed of a chain of neurones. In the earliest swimmers the initial response, excited by cutaneous stimulation, is supplemented by a proprioceptive " muscle-sense " response excited by the muscular contraction itself, and thus the rhythm of serpentine locomotion is maintained (Figs. 5 and 6). At this age the same peripheral sensory neurone may serve both as exterceptor and as proprioceptor (Figs. 2 and 3) and on the efferent side of the arc there is also a lack of differentiation between the tract neurones and the peripheral motor neurones (Fig. 3). The only possible reaction to stimulation is a total response of the somatic musculature—the swimming reaction.

In the spinal cord of the half grown larva the simple peripheral sensory neurones of the earliest stage have been replaced by definitive spinal ganglion neurones, among which those concerned with exteroceptive responses are probably distinct from those involved in proprioceptive reactions. Long ascending and long descending tracts are differentiated within the spinal cord and peripheral motor neurones are now distinct from those of the long descending motor tracts. By the elimination of numerous synapses, conduction in the spinal cord is much more rapid than in the younger embryos of the first reacting stages. In addition to these

long paths, short reflex connections are now possible within a single segment of the cord. Nevertheless the dendrites of both individual correlation neurones and motor neurones reach all parts of the white substance, so that whatever the source of the stimulus a common type of total response habitually follows, as in the younger specimens—a simple swimming reflex.

The mammalian spinal cord shows a much more complete differentiation of individual reflex systems and a more perfect isolation of the long conduction pathways.

In the medulla oblongata of the half grown larva the peripheral sensory neurones show a high degree of functional specificity, and the central neurones of the second order tend to be grouped around these special sensory roots. But the functional localization of these secondary centers is not complete, each neurone having a dominant relation to some particular system of root fibers but also subsidiary connections with other functionally distinct systems of root fibers. Thus each primary bulbar center reached by terminals of sensory root fibers is also to some extent a correlation center, the secondary tracts are all of mixed function, and the analysis of function in the reactions is still incomplete. The peripheral sensory neurones, though segregated into functional systems as distinctly as in the cranial nerves of higher vertebrates and much more so than in the spinal nerves of any forms, are similar to those of the spinal nerves in that each fiber centrally reaches practically the entire length of the oblongata, giving to the primary sensory centers a longitudinal columnar arrangement which is apparently much more primitive than the more condensed sensory nuclei of mammals.

In the mammals the functional differentiation of the primary bulbar centers is complete and the functions of correlation are transferred to higher cerebral centers. Simpler total reactions of the more primitive sort are, however, still provided for in the reticular formation of the oblongata in these higher brains.

Throughout this series of forms of reflex connections we find a progressive differentiation of the specific reflexes away from the type of total reaction and the gradual perfection of a great variety of individual adaptive movements, for each of which a particular chain of neurones is set apart. Rapid conduction through each of these circuits is then facilitated by the elimination of unnecessary synapses and the closer articulation of the residual neurones. From this it follows that the "typical" two-neurone, short-circuit connection between dorsal and ventral root fibers, as illustrated by Fig. 1, appears late in development and is not to be regarded as a primitive form. In fact, all of the long correlation pathways of the central nervous system appear to develop relatively late in the ontogeny out of more complex chains composed of many more neuronic units. In this connection one is reminded that in the human brain the longest path of all, the pyramidal tract, is one of the last to mature.

How far the embryological sequence shown in the development of these pathways in the amphibian brain should be interpreted as evidence of the phylogenetic sequence, it would at present be premature to affirm positively. But it seems probable to us that the relations found in amphibian larvæ are in many respects primitive; and this is in accord with the known form of connection of the nervous elements in the simplest types of nervous system and with the prevailing belief that every form of

central nervous system has arisen by the concentration of an originally diffuse and relatively equipotential peripheral ganglionated plexus in the interest of an integration of all bodily functions. Parallel with this integrative process there was a progressive individuation of particular reflex circuits and their segregation out of the primordial general nervous matrix. Special correlation centers must then be developed in order that the primary integrative action of the nervous system may not be impaired in this process of individuation of its parts; and the more complex the particular functions of the parts, the more important become the correlation centers. Thus arose the great suprasegmental apparatuses (cerebellar and cerebral cortex) superposed upon the more ancient reflex systems of the brain stem.

Finally, we would urge that the factors operating in either the ontogenetic or the phylogenetic differentiation of the functional mechanisms of the brain cannot profitably be investigated without a precise knowledge in each stage investigated of the peripheral relations of each of these functional systems and of the interrelations of the neurones involved at every step in the progress of the nervous impulse from periphery to center and back to the effector organs during the normal course of functional activity.

JELLIFFE.

A STUDY OF GANGLION CELLS IN THE SYMPATHETIC NERVOUS SYSTEM, WITH SPECIAL REFERENCE TO INTRINSIC SENSORY NEURONES. F. W. Carpenter and J. L. Conel. (The Journal of Comparative Neurology, Vol. 24, No. 3.)

Summing up, the writers state that (1) Sympathetic ganglion cells of the cat prepared by the Cajal silver-nitrate method show both Dogiel's "motor type" of cell with heavy dendrites and his "sensory type" with slender dendrites. They also show cells with intermediate structural characters connecting the two "types." On the basis of external cell morphology it cannot be said, therefore, that two distinct kinds of elements exist in the sympathetic ganglia. The "types" of Dogiel are, in the opinion of the authors, to be regarded as extremes of the variation which occurs among the multipolar sympathetic cells. (2) Sympathetic ganglion cells of the rabbit prepared by the Nissl method present a quite constant picture of the chromatophile bodies, which tend to be arranged near the periphery of the cell body. The cells cannot be divided by this feature of their internal morphology into two well-defined groups. (3) As far as anatomical observations made by the authors go, there is nothing to indicate that ganglion cells of opposite, *i. e.*, motor and sensory function exist in the sympathetic system. If their structural similarity is an indication of similarity in function, then all must be motor, since it is the presence of intrinsic sensory neurones only that is open to question. (4) The sympathetic ganglion cells of the rat, mouse, thirteen-lined spermophile, prairie dog, muskrat, guinea-pig, and porcupine present a Nissl picture similar to that seen in the sympathetic cells of the rabbit. (5) In the rabbit many binucleate cells were found in the vertebral and prevertebral ganglia of the trunk region (sympathetic division proper of the autonomic system). Such cells were not seen in the cranial autonomic ganglia, nor in the plexuses of the intestinal wall (peripheral ganglia). (6) The sympathetic ganglia of the guinea-pig, muskrat and porcupine possess, like those of the rabbit, a

considerable number of cells with two nuclei. Such cells are rarely if ever to be found in the sympathetic ganglia of certain other rodents, viz., the rat, mouse, thirteen-lined sphermophile and prairie dog.

JELLIFFE.

INTESTINAL STASIS. A. Bassler. (Journal A. M. A., Oct. 24, 1914.)

This author criticizes short-circuiting operations for intestinal stasis and the views of Arbuthnot Lane generally in regard to intestinal stasis. The clinical picture described by Lane has been well known for years, and the definition of stasis he gives leaves only a matter of body drainage to deal with. Certain bands holding portions of the intestine are, in his view, primarily responsible. Bassler says that any one can show that at least 18 per cent. of all people have ileal kinks causing perhaps some obstruction, but no toxemia, and it can also be shown in the majority of those who come under medical observation that such kinks are not responsible for the symptoms. In 167 cases observed by him with Roentgen-ray examination, in only five did the kink delay intestinal drainage, and he is convinced that unless the ileum is dilated proximally to the kink, it is of no significance. He has observed several patients who have been operated on in which the bands reformed in six months, and when stasis is produced he holds it is because the intestine has elongated and sagged, not because it is an obstruction. As regards the stomach being responsible for gastric or duodenal ulcer, Bassler says experience has proved that in most cases of ulcer there is no intestinal stasis. There is also a question in his mind whether or not dilatation of the duodenum is an indication of intestinal stasis, and he mentions his observations previously reported[1] in support of his opinion. The Roentgen-ray method of diagnosing intestinal stasis, while valuable and the best we have, is liable to give rise to fallacious conclusions, and we should be conservative in our opinions based on it. As his experience grows he is paying less and less attention to this means of diagnosing gastric stasis. The medical remedial measures are not given sufficient credit for the good results in the surgical cases. Lane reports that cancer of the pancreas and stomach is due to intestinal stasis, but fails to account for those cases in which this condition has not existed. In several hundred patients observed by Bassler who had the symptoms Lane describes and have not been operated on, the results have been as good as he has been able to report. Kellogg and Case add torsions of the cecum and colon and ileocecal valve insufficiency as causes of the trouble. Incompetence of the valve is a clinical finding in some of these cases and may have its significance, but in this we must remember we are dealing with a resulting condition, and the end-results of operation will not be as bright as Kellogg and Case have presented them. A careful study of the function of this valve shows that at times its relaxation permitting backward flow from the colon is a normal phenomenon. After an operation, or for whatever reason, food has been withheld for days, influx through the valve is common, it being an effort on the part of Nature to obtain better nutrition. In habitual constipation a constant relaxation of this valve is due to gas pressure in the colon, which eventually overcomes its resistance. Careful post-mortem work in these cases will often show a degeneration of the sympathetic nerves of the valves and their centers. Bassler holds that infections of the intestinal contents are the primary factors of greatest importance in connection with toxemia of the elementary tract. Bacteriologic examination of the stools

[1] Journal A. M. A., Dec. 20, 1913, p. 2217.

of the patients compared with those of normal individuals would be at once significant. Early in life the intestinal canal is infected and the infecting organism becomes a symbiotic parasite and gets in its work later in life when the indiscretions and habits of the individual more readily permit it. The constant resorption of the bacterial products first affects the neighboring tissues. Gradually the sympathetic fibers degenerate and the ganglia are involved, and with the loss of the inhibitory power of the sympathetic the whole of the viscus dilates and the bacteria may gain entrance into the blood-stream. The alterations of the secreting organs, the pancreas, the intestines and the stomach, which take place early in the process, and the degeneration of the musculature are also of importance. To Bassler the subject is a medical matter all the way through. Minor operations for complications may be needed in some cases, but the major operation of Lane for simple stasis or toxemia, never.

THE ETIOLOGY AND CURE OF PELLAGRA. G. Alessandrini and A. Scala. (Bertero. Roma 1914. London Lancet.)

The authors have published in the form of a large pamphlet containing excellent colored reproductions of histological and other specimens a communication made by them last year to the Royal Academy of Medicine at Rome under the auspices of the Commission on Pellagra. Their researches have led them to two fundamental conclusions: (1) that pellagra is not dependent on a maize diet; and (2) that it is a disease strictly localized and limited to areas where water is drunk which has been almost exclusively in contact with a clay soil. Hitherto it had not been suspected that common mineral substances, in the quantities present in drinking water, could provoke immediate or delayed disturbances of health, and it was only investigations as to the quality of the soil which was the source of the water drunk in pellagrous districts that led Professor Scala to formulate the suspicion that silicic acid in a colloidal state could produce a chronic intoxication such as is observed in pellagra. Ninety-four experiments were undertaken on monkeys, rabbits, guinea-pigs, and puppies, and consisted in the administration of silica in colloidal solution and in a gelatinous state by subcutaneous and intraperitoneal injection and also by mouth. The effect was an intoxication with symptoms and pathological changes similar to those observed in pellagra. These experimenters also found that a similar intoxication was produced by the administration by mouth, mixed with bran, of water obtained from the pellagrous district of Gualdo Tadino; and, moreover, that the feeding of animals exposed to the action of silica with maize had no effect in aggravating these symptoms, proving thereby that maize has in no sense a contributory action. The effect of silica on the organism is to cause a retention of salts, whence there ensues, first, excessive fixation in the tissues, and subsequently liberation of mineral acids, also excessive, which produce the pathological condition noticed by the authors. Silica, therefore, acts in an indirect rather than in a direct manner, and it was found that its effects could be neutralized by intramuscular or subcutaneous injections of neutral citrate of sodium. The authors were thus led to make use of this fact in an attempt to cure pellagrous patients. Details are given of ten cases treated with daily injections of a 10 per cent. solution of trisodic citrate. That considerable improvement, if not cure, was obtained is evident from the photographs given in the pamphlet, and it may suggest the advisability of adopting this method of treatment in those cases of pellagra which are from time to time met with in this country.

THE SITE OF FUNCTIONAL HEART-BLOCK. T. Lewis. (Heart, Vol. V, 1914.
 p. 247.)

The author in tracing the developments which led up to the modern
interpretations of heart-block says that there elapsed a considerable in-
terval of time between the discovery that under certain conditions the
auricles could beat independently of the ventricles, and the further evi-
dence that lesser degrees of heart-block could be caused by such in-
fluences as vagal stimulation or drugs such as digitalis. Whilst the
former gross forms of heart-block are recognizable in many cases by the
extraordinarily slow pulse and frequent syncopal or epileptiform seizures,
the lesser degrees of block, causing, perhaps, only a lengthening of the in-
terval between auricular and ventricular systoles, cause no disturbance of
either pulse rhythm or rate. The latter forms of block may arise from
slight lesions of the bundle of His; they may also arise from the causes
above noted. It is now known, further, that the conducting system is
made up of several parts; there is the auriculo-ventricular node at the
" top " or auricular end of the bundle; then the bundle proper—a short,
tiny structure; then its two branches to the right and left ventricle re-
spectively; and, finally, its terminal branches within the main ventricular
mass. It has now become important to discover at what particular site or
sites in this system functional block occurs. If block occurs at any one
of the constituent structures, the end result, namely, disturbance of
auriculo-ventricular sequence, is the same. The degree or type of block
will therefore not assist in this matter. The observations upon which the
paper is founded were made upon dogs, and electric curves demonstrated
the effects induced. By slowing the heart rhythm at the sinus—the nor-
mal site of origin of the heart's contraction—he produced what is known
as the $a.-v.$ rhythm (nodal rhythm). In such a rhythm the heart's con-
traction is initiated at the $a.-v.$ node, not the sinus, and as a result auricles
and ventricles contract practically simultaneously. When such a rhythm
was induced vagal stimulation was applied. The result of this procedure
is important. Instead of producing a " forward " or typical heart-block,
a block in which the ventricle follows the auricle, but at a longer time
interval, the reverse occurred; the auriculo-ventricular interval, which in
$a.-v.$ rhythm may be 0.04 second, instead of the normal 0.12 to 0.16 second,
is still further reduced. The interval may be *nil*, or even a minus quantity.
Such a result shows that the block is situate between node and auricle,
since the pause between node and auricle delays the latter and so pushes
it later and approximates its time-incidence to the ventricle. Functional
block, then, has its seat at or in the immediate auricular vicinity of the
$a.-v.$ node. The observations showed also an additional fact. It was
demonstrated that vagal action is more powerful upon the $a.-v.$ node than
upon the sinus. The value of this effect is obvious. If it were not so, it
is possible that with high heart rates, such as those following exercise, an
$a.-v.$ rhythm would be readily induced, but the associated controlling ef-
fect of the vagus sustained during exercise upon the $a.-v.$ node to a greater
relative degree ensures little opportunity for its rhythmicity to exceed that
of the sinus and thus initiate the rhythm. In this way the normal $a.-v.$
sequence is preserved over wide variations of rate The observations are
of much value and reveal, incidentally, in a rather unexpected manner still
another protective mechanism for preserving intact, under wide possible
variations of conditions, the heart's vital action.

JELLIFFE.

SALVARSANIZED SERUM. C. E. Riggs and E. H. Hammes. (J. A. M. A., Oct. 10, 1914.)

The authors discuss the results of 100 injections of salvarsanized serum in twenty-four cases of nervous syphilis. Four of the cases are reported in detail. Previous methods of treatment have been ineffective in the so-called parasyphilitic diseases. The advisability of the intraspinal injection of spirocheticidal solutions into the spinal cranial subarachnoid space is desirable but only of the drug to be injected and the relative merits of the *in vitro* and *in vivo* methods. As to the former, the authors do not consider the greater spirocheticidal activity compensates for the greater danger in its use. There has been only one case reported so far of fatal results following the Swift and Ellis method, and as Swift has said in a personal letter to Dr. Hammes, can only be accounted for by faulty technic. In only one of the authors' cases did they have any trouble with the Swift and Ellis method. Marked benefit followed in the tabes cases but the results in paresis were not so satisfactory, probably on account of the advanced stage of the disease. Some improvement, however, was noted though a greater number of injections were required. Even a temporary amelioration of a disease as hopeless as paresis is something of a success. Certain cases of tabes and paresis prove most refractory and here the salvarsanized serum injections should be employed, favorable results being sometimes obtained after other methods fail. The reaction following salvarsanized serum is usually slight. The temperature seldom goes above 100° F. and generally is about 99° and the rise lasts from twenty-four to forty-eight hours. Severe headache, vertigo and vomiting rarely occur. In tabes there is usually a marked increase in the lightning pains for one or two days but after that they appear to be greatly benefited. In only one case did the authors have any anxiety; it was a case of acute luetic meningomyelitis developing on a tabetic base. It was evidently an aseptic chemical meningitis following an injection of a serum. The authors' conclusions are as follows: " (1) Clinical improvement and serobiologic reduction usually go hand in hand. (2) The report of cases without associated laboratory reactions is unscientific and valueless. (3) The intraspinal use of salvarsanized serum, as conceived and elaborated by Swift and Ellis, is a notable advance in the therapy of syphilitic affections of the central nervous system; it furnishes the one avenue of approach for spirillicidal drugs to the otherwise inaccessible spirochetes. (4) It is a safe procedure in the hands of trained and properly equipped men. Whether it will bear the final test of efficiency, namely, cause pleocytosis, globulin excess and a positive Wassermann in the blood-serum and spinal fluid permanently to disappear, is yet to be demonstrated."

RECOVERIES IN THE BOSTON PSYCHOPATHIC HOSPITAL. E. E. Southard. (Bost. Med. and Surg. J., Sept. 24, 1914.)

The author here analyzes a series of 100 recoveries at the Boston Psychopathic Hospital with reference to the particular share of the element of nursing in these recoveries. He finds that the component of nursing cannot be omitted from these recoveries, brief as was the time of the hospital stay of the majority of the cases. This is proved by the incidence of disorder of heat regulation (fever, hypothermia) in at least 37 per cent. of the cases. The special value of nursing, and particularly of hydrotherapy, stands out from the results of the treatment of

alcoholic psychoses, which though they form only about one-ninth of the problem of first care, represent almost nine-tenths of the early therapeutic results The recoveries in the so-called " recoverable" forms of insanity take too long to be represented in any numbers in this first hundred of recoveries and it may be suspected that the average hospital stay of three to four weeks is not sufficient for recoveries in groups like manic-depressive insanity. The effect of psychotherapy as applied in the Psychopathic Hospital, is not a rapid effect. The percentage of syphilis in the recovered cases is exactly that of the total intake of the hospital, so that this factor cannot be said to influence treatment unfavorably. Some index of the activities of the after-care service is afforded by the fact that nearly half of the patients either resorted voluntarily or were brought to the outpatient department at one or more periods subsequent to the discharge. The need is apparent of nurses who shall build their psychopathic training on a sound basis of general hospital work.

JELLIFFE.

GANGLIONEUROMA OF THE SUPRARENALS. J. Munro and H. Dunn. (Glasgow Medical Journal. Aug., 1914.)

The patient was a boy three and a half years old. His family history was negative. At the time of examination, about six months after the beginning of his ill health, there was marked pallor of the face, and large veins were seen on the forehead. The limbs were emaciated. A large mass was found in the situation which an enlarged spleen might occupy, but the anterior edge was thick and rounded and the mass extended more transversely than if it were a spleen. It was firm and easily movable. The hemoglobin was forty-eight per cent., erythrocytes 2,020,000, leucocytes 4,000; urine normal. On the operating table a large retroperitoneal swelling, occupying the renal fossa, was found. A reniform body was found at the lower end of the swelling, which body corresponded to a large suprarenal. Considerable glandular enlargement in the prevertebral and cecal regions. Patient died before the completion of the operation. Pathological report showed the tumor to be composed of firm, pale tissue and in part of soft, hemorrhagic tissue ; metastic deposits in the retroperitoneal, mesenteric, medias' nal, cervical and inguinal glands. Tumors were also present in the ribs and bones of the skull. The liver and spleen were free. Histologically the firm, pale tissue was composed of nervous tissue ; the soft, hemorrhagic areas, of small cells corresponding to the embryonic nerve cells which form the sympathetic nervous system in normal development. The secondary tumors were composed exclusively of the small celled malignant tissue.

JELLIFFE.

THE CEREBROSPINAL FLUID AND HYDROCEPHALUS. W. E. Dandy and K. D. Blackfan. (J. A. M. A., Dec. 21, 1913.)

These authors have studied the subject of acquired and congenital hydrocephalus laying particular stress on the cerebrospinal fluid. The excessive accumulation of this fluid not only plays a part in the clinical expression, but also is often the determining factor in the high mortality-rate of these diseases. There must be a disturbance of the balance between secretion and absorption to account for the abnormal increase, but which of the two factors is the more potential has been a matter of conjecture. These authors were able to demonstrate by the production of an

artificial hydrocephalus, not only that practically all the fluid was generated within the ventricles, but also that there was no absorption within the ventricles. Furthermore, by the injection of phenolsulphonephthalein, these observers were able to establish a normal standard for the excretion of phenolsulphonephthalein after its injection into the ventricles or subarachnoid space, and have further used the phenolsulphonephthalein test to distinguish clinically between two forms of hydrocephalus, one with, and the other without, obstruction to the ventricles. In a similar series of experiments Frazier was able to demonstrate by the phenolsulphonephthalein test that the venous channels play the most important part in absorption, and that the lymphatic absorption is a negligible factor. When the phenolsulphonephthalein was injected into the ventricle, the dye-impregnated cerebrospinal fluid appeared in the torcular herophili in two minutes, whereas it took almost twelve hours for it to reach the lymphnodes of the parotid group when injected into the subarachnoid space. Of the earlier contributions, the most important by far were those of Faivre, Luschka, Francini, Levaditi and Mott, who by histologic evidence have shown that the cerebrospinal fluid is a secretory product of the choroid plexus, or as Mott describes it, the "chorioid gland" with an external secretion and an internal destination. Dixon and Halliburton and Frazier have been conducting independently a series of experiments in their laboratories on the hypothesis that inasmuch as the choroid plexus is a gland with a secretion, its function might be increased or decreased by certain influences. Dixon and Halliburton found that the injection of brain extract and more particularly the extract of choroid gland caused a hypersecretion, attributed to the specific action of some substance—possibly a hormone product of brain metabolism—on the secretory cells of the choroid gland. Of greater significance is the finding by Frazier of a substance which has a distinctly inhibitory effect. In marked contra-distinction to all other glandular extracts, the extract of the thyroid gland was unique in that it caused a continued and prolonged decrease in the flow of cerebrospinal fluid, wholly irrespective of the effect on blood-pressure. It is often a far cry between laboratory demonstration and clinical application, but these experiments offer a hope of dealing with the problem of perverted secretion at its source.

BERIBERI IN NEWFOUNDLAND. J. M. Little. (Journal A. M. A., Oct. 10, 1914.)

The author in a previous paper has maintained that beriberi is caused by white flour as well as by polished rice and gave some statistics and observations regarding beriberi in Newfoundland. He first remarks that the people in Newfoundland frequently observe the condition of hens suffering from polyneuritis gallinarum when fed exclusively on white bread. Beriberi among the fishermen has been previously noticed by Putnam, of Boston, and Birge, of Provincetown, and also by Drs. Grenfell, Brehm and Smith. The disease is rare among deep-sea fishermen except on vessels where the standard of diet is low, and is almost unknown on American fishing vessels. The food on these vessels is practically the same as that of the people living ashore and consists continuously of tea and bread, fish, salt meat and occasionally duff with raisins. It is on vessels that go far away from the base of supplies that beriberi is met with. The diagnosis of beriberi has been made 210 times in the last 5,000 cases seen in the out-patient department of the St. Anthony Hospital. Among these

there have been six deaths, all in acute cases from heart failure or failure of respiration. Little does not believe in the difference between ship beriberi and true beriberi and thinks that the distinction causes confusion. It is one of the deficiency diseases, developing whenever the patient has been long enough deprived of certain elements of diet which have been called "vitamins," as among rice eaters who use only milled rice and wheat eaters who do not take a sufficient quantity of other foods. The onset depends on the length of time the patient has been on a deficient diet and the premonitory symptoms have sometimes been spoken of as an incomplete form of beriberi. These premonitory symptoms are due mainly to functional derangement of nerves or groups of nerves with special susceptibility of the vagus and the nerves of the lower extremities. The clinical course will depend on whether the nerves of the extremities or those of the more vital organs are most affected and on the extent of the disease. In the dry form there will almost always be some edema, perhaps slight and transient, and tachycardia and shortness of breath from functional involvement of the vagus or phrenic nerves. If these nerves bear the brunt of the attack the usual signs of broken compensation will follow as the nerve trouble advances beyond the functional stage. This constitutes the "wet" form and in a rapid onset the active, pernicious or cardiac form. In the most pernicious variety without edema the respiratory nerves are probably most at fault. In the forms where the extremities bear the brunt of the attack there is less danger to life. The important thing in diagnosis is to recognize the premonitory symptoms and atypical forms and the possibility of intercurrent disease must be kept in mind as well as the other deficiency diseases. The confusion with scurvy should be avoided and if the functional or degenerative nerve involvement is shown, beriberi should be diagnosed. The prognosis is good if proper diet is used and the disease has not advanced too far and no other serious disease occurs as a complication. If former habits of diet are resumed an aggravated recurrence is probable. The treatment of the disease is, first, a proper diet with absolute rest in bed. Digitalis must be used with care and strychnin and quinin seem indicated by clinical and experimental observations (Cooper). The subject of deficiency neuritis, Little says, is more and more deserving of consideration. Beriberi is generally considered a tropical disease due to a one-sided diet. The vaguer symptoms and results may be present when the diet is not so considered. Meat is getting dear and food is becoming more and more denatured by modern methods. It may be that recognition of neuritis, due to unsuitable diet, may clear up many obscure cases that have previously puzzled physicians.

SEROSALVARSAN TREATMENT OF PARESIS. L. B. Pilsbury. (Journal A. M. A., Oct. 10, 1914.)

This author reports on the treatment of thirteen patients with paresis with salvarsanized serum, two of whom received only two injections and are not reported on in his tables. One is not improved and the other is dead. In all 62 intraspinal treatments have been given. "Only salvarsan has been used and wherever an intravenous salvarsan injection is shown in the tables the intraspinal injection was given on the following day. A few intravenous injections are indicated which are not followed by the usual intraspinal treatments. As soon as the blood was withdrawn the fibrin was whipped out and the blood diluted with an equal amount of

physiologic salt solution, so as to make a 50 per cent. serum. This was left in the ice-box over night, the serum removed the following day and heated at 56° C. for from one-half to one hour, the period varying some-what. The injection was made with an ordinary glass cylinder, a small rubber bulb being attached to the lowest arm of a glass T, so as to make slight pressure when needed. The usual interval before withdrawal of blood was one hour, but this was sometimes shortened to one-half or three-quarters of an hour. McCaskey now recommends an interval of only twenty minutes as he thinks the spirocheticidal power of the blood is then at its height. After some vacillation I decided on 30 c.c. of 50 per cent. serum as a standard dose, an approximately equal amount of spinal fluid being withdrawn. The usual interval between treatments was two weeks." Six of the eleven patients mentioned in the tables show improvement in some respect, not necessarily clinical. One is no better and four are dead; all cases were well advanced. In most cases the tendency has been toward a reduction in the amount of globulin, albumin, number of cells and in the spinal fluid Wassermann. All of these particulars are shown in charts for each case.

VIERTER INTERNATIONALER KONGRESS ZUR FÜRSORGE FÜR GEISTESKRANKE. Berlin. Oktober, 1910. Herausgegeben von Prof. Dr. Boedeker und Dr. Falkenberg. Carl Marhold. Halle a. S.

This volume of some 1,000 pages contains the official proceedings of the fourth international congress for the care of mental disorders. It reflects better than any other medium the status of the art and science of applied psychiatry and as such marks a permanent place in the evolution of that comprehension and care of those with such mental disorders as more particularly need custodial care.

There are a number of original papers. To pick any out as meriting more attention than others would solely be a reflection of the reviewer's point of view. All aspects of psychiatry are dealt with.

Some of the papers which have attracted our attention are several dealing with the relationship of civilization to the production of psychoses. A number of interesting discussions on the psychiatry of armies and navies are worth glancing at in view of more actual experiences. A thorough review of the subject of sleeping sickness is presented.

The volume is one of considerable interest and may be consulted with great profit.

JELLIFFE.

Book Reviews

SÉMIOLOGIE DES AFFECTIONS DU SYSTÈME NERVEUX. By J. Dejerine. Masson et Cie. Second Edition, 1914.

In issuing this second edition the author says the work has been " completely revised and considerably enlarged." This statement is literally correct. The reviewer has compared the new edition with the old, page by page throughout the book, in order to detect the additions. It is evident that much has been rewritten, and that in some places whole paragraphs or chapters have been added, as well as many photographs of patients and new and valuable designs. The new edition is considerably larger than the old and many of the designs are in colors.

The part on hypnotism has been rewritten, and the discussion of agnosia, apraxia and amnesia is new. According to Dejerine, astereognosis does not exist without some disturbance of peripheral sensation. The chapter on aphasia is enlarged for a discussion of Marie's views. The term " pure motor aphasia " is no longer given as synonymous with " subcortical motor aphasia," as it formerly was, for Dejerine says the lesion in " pure motor aphasia " often is subcortical but is not always so. Space is permitted for the presentation of aphasia in left-handed persons, as this subject has had important enrichment in recent years. More space also is allowed for the consideration of the mental state of aphasics, and Dejerine holds that intellectual deficit is not invariably present in aphasia. He now places the motor area entirely in front of the Rolandic fissure.

The chapter on lesions of the brain stem is new and important. Here are worked out in detail, with the aid of many diagrams, the symptom-complexes caused by lesions of the cerebral peduncles, pons, or medulla oblongata, and the explanations are made in conformity with the anatomy of the parts. The statements necessarily are concise, but one might be excused for desiring references to cases with necropsy which permit certain of these. Is it certain that slowing of the pulse, lowering of the temperature, respiratory disturbances of the Cheyne-Stokes or Stokes-Adam type, and oculo-pupillary sympathetic phenomena, reveal the existence of a lesion near the dorsal motor nucleus of the vagus? Is it certain that conjugate deviation, associated ocular palsy and vertigo occur especially when the most superior part of Deiters' nucleus and the fibers from this part are injured; that nystagmus occurs especially from lesion of the superior part of this nucleus; and that ataxic gait and change in the reflexes occur from lesion of the inferior part of this nucleus? Is it certain that a destructive lesion of the sensory nucleus of the fifth nerve within the pons or of the nucleus of the descending spinal root may cause keratitis or herpes? These and other important statements in this interesting chapter must stand on Dejerine's authority.

In recent years many minor signs of hemiplegia have been described as useful in slight paralysis or where organic hemiplegia is to be distinguished from hysterical. Dejerine has done good service in collecting these signs under one heading. The spinal form of intermittent claudication also is described in this new edition.

According to Dejerine, the results of electrization of the cerebellar cortex and of resection of limited areas of the cerebellar cortex, obtained by some investigators, are far from being generally accepted. The questions regarding cerebellar localization, he says, have been put but not yet answered. The cerebellum has an important rôle in maintaining equilibrium, but this rôle is shared by the sensori-motor cerebral cortex and the labyrinth with its cortical representation. The chapter on cerebellar disorders has been rewritten in order to do justice to the recent investigations.

In the chapter on paralysis of peripheral nerves more nerves are considered individually than in the previous edition. The chapter on the sensory pathways also has been largely rewritten and recognition is given to Head's investigations on sensation. Dejerine still maintains that motor and sensory fibers are intimately mingled in the internal capsule. The thalamic syndrome also is discussed, as are the inversion of tendon reflexes and the reflexes of defence.

In this edition is found a consideration of the chronic trophedema of Meige and the adiposis dolorosa of Dercum, and much attention is devoted to the gastropathies. The chapter on disturbances of the special senses, especially those relating to hearing, smelling and taste, has been largely rewritten, and the chapter on the cerebrospinal fluid is entirely new.

One may justly assert, after a study of this work, that it is one of the most important contributions made to neurology, and that it contains the ripe experience of one of the most distinguished neurologists.

SPILLER.

THE CHEMIC PROBLEM IN NUTRITION (Magnesium Infiltration). A Sketch of the Causative Factors in Disorders of Nutrition as Related to Diseases of the Nervous System. By John Aulde, M.D. Philadelphia, 1912. Price, $3.00.

In this radical attempt at a monistic interpretation of the relations of biochemical phenomena to nervous and mental disorder we have an elaboration of those writers of the latter half of the seventeenth century who founded the iatrochemical sect. According to Sylvius, an industrious student of Van Helmont and Descartes, health depends upon the relation of the fluids, acid and alkaline, their union producing a neutral and milder substance. Two kinds of diseases were distinguished, the result either of acid or alkaline acridity. Among the prominent followers of Sylvius might be mentioned Willis, the celebrated English anatomist; Glauber, the discoverer of sodium sulphate (Glauber's salt), and many others; but iatrochemistry gradually lost repute, and was completely overthrown early in the eighteenth century, principally through the teachings of Hoffmann.

Acidosis is its modern resurrectional symbol. *Elimination* was the old manner of handling it. Inasmuch as this smacks too largely of the imitative magic of primitive medicine which through its noises, sights, and invocations puts disease to flight, even through the pores, the bladder and the rectum, the author suggests *neutralization*. Magnesium infiltration is the great thing to be neutralized.

The work is divided into three sections, ostensibly for the purpose of establishing what the author terms a scientific basis for the rational treatment of diseases of the nervous system. The first two chapters—" General Considerations "—deal with the various questions relating to health maintenance, especially pointing out the insidious and progressive character of disorders arising from chemic deviation.

More in detail we find these questions answered in the section on " Disorders of Nutrition." Whether it be from the physiological viewpoint, from a study of the peculiarly intricate processes incident to metabolism, or the enormous surface energy of inorganic ferments, the chemic deviation responsible for magnesium infiltration is never overlooked.

Naturally, the reader wants to know how magnesium has all at once become such a dangerous factor in modern civilization, and this question is taken up in a separate chapter, entitled " The Food Problem, with Dietary Studies." It shows how a dietary containing magnesium in excess of the normal demands of the system gives rise to digestive derangements, defective secondary assimilation, with consecutive involvement of the nervous system, a parallel being found between pellagra and the injurious effects of magnesium on plant life.

THE INDIVIDUAL DELINQUENT. A text-book of diagnosis and prognosis for all concerned in understanding offenders. By William Healy, A.B., M.D. Little, Brown and Co. Boston.

Aside from its technical value for those actually engaged in work with delinquents this volume must inspire a deep and thoughtful interest among all students of the sources of human conduct. It is in reality an illuminating report of investigations made for practical diagnostic and prognostic purposes among delinquents, a work embodied in the Juvenile Psychopathic Institute of Chicago with Dr. Healy as director. This has now been made a department of the Juvenile Court of Cook County.

The first section of the book, therefore, is a statement of the point of view taken by the author and his colleagues in the work with a somewhat detailed description of their methods of examination and classification of findings in regard to the subjects studied. This is made explicit in order to make clear the true nature of the work and to furnish a practical guide for others engaging in such social service.

The second part of the book, by far the greater division, exhibits these principles and methods at work and illustrates very fully by concrete instances what the results are in knowledge of criminality and in practical preventive and educational work among delinquents. The report is made on a study of 1,000 cases of juvenile recidivists, in whom causative factors in their interrelations can best be studied and with whom prognosis and successful methods of treatment are best exemplified.

These illustrative case reports as well as deductions made from them display the effectiveness of these methods of study and the eminently sane and broadminded attitude which is taken toward the subject in all its bearings. That point of view which attempts the classification of delinquents according to fixed types, recognizes a born criminal class and the like is quite reversed and the question of responsibility from a legal standpoint is considered with a view to the treatment of the offender which will safeguard the welfare of the individual delinquent and of society as well. The study is first and always that of the individual. The causes of delinquency are too manifold, too intricately interwoven, too frequently overlapping for fitting into hard and fast systems either of types of causes or of criminal behavior or for fixed modes of treatment. The complexity of mental life in its determinants as in its activities cannot be understood except through such study of the individual. Careful work upon each personality discloses certain types of antecedents, certain types of reaction which for practical purposes may be brought into a loose classification,

but this must always be flexible, serving merely the tabulating of results or at most as a guide to the definite, actual study of causation.

The many factors that make for delinquency receive careful consideration and evaluation. The difficulty of distinguishing heredity from the influence of environment is plainly recognized. Inheritance is rather of constitutional predisposition than of definite criminal tendencies as such. Many factors enter into environment which are discussed under developmental conditions, antenatal, natal and postnatal and include family conditions, school life, companions, reading matter, influence of moving pictures, all the many elements which enter into the life of the developing individual forming his character and determining his behavior. Physical conditions are not overlooked nor the influence of drugs. The question of mental defect, mental aberrations, of all forms of mental abnormality are taken into account. The author never fails to see and emphasize that not one but many factors working together make for the delinquency, which only serves to enforce the need of individual work. It impresses us, moreover, with the necessity for carefully planned and wisely carried out effort directed toward the individual for prevention and cure of delinquency. What has been thus accomplished the cited cases convincingly show.

For the psychoanalyst's profound investigation of the determinants of thought and action this book offers fresh material for earnest consideration. Dr. Healy's principles of investigation and interpretation, his methods of work are largely those of psychoanalysis. Working to a great extent with younger delinquents he acknowledges that he has reached satisfactory results in healthful readjustment individually and socially without such extensive work as a long-established neurosis would require. He does not, however, commit himself fully to the fundamental discoveries of psychoanalysis. He has proved most fruitful in his work the consideration of mental conflict and repression as well as recognition of substitute reactions for repressed or even consciously disturbing elements. Yet to the student of the most fundamental elements of psychical life all his case studies are impressively suggestive of deeper conflicts due to profoundly hidden complexes symbolically manifested in these substituted reactions.

<div style="text-align: right">JELLIFFE.</div>

MECHANISM, LIFE AND PERSONALITY. By J. S. Haldane, reader in physiology, Oxford. The E. P. Dutton Company. New York. $1.00.

It is asserted by many that since philosophical systems hence they are vain and are not subjects for practical men. "Such teaching," our author tells us, "is unworthy of every tradition, which has helped to raise us from the level of primitive savages. Even if it were true that philosophical speculation has heretofore led to no definite results, we should not be men if we give up the quest after truth. It is only a shallow and ignorant mind that sees in the history of philosophy nothing but a series of systems, each as bad or as good as the others, and succeeding one another like the turns in a vaudeville performance."

"The progress of philosophy has been just as continuous as the progress of science, and the history of philosophy appears to be a meaningless succession of systems to those only who have never taken the trouble to understand them."

This little volume of four lectures and of 140 pages is a very delightful collection, which may be briefly summarized.

In the first lecture he states the arguments in favor of the mechanistic theory of life, and the fatal objections which may be urged against vitalism or animism. The second lecture is devoted to criticism of the mechanistic theory. The author has endeavored to show that the experimental evidence, which has been brought forward in support of this theory, will not bear critical examination, and that the popular idea that the progress of physiology is in the direction of confirming or supporting the mechanical conception of life is a complete illusion. He then proceeds to discuss, in the light of biological facts, whether by any possibility the mechanistic theory may not still be correct. The result of this discussion is that there is no such possibility. The physical and chemical conception of the world breaks down absolutely and hopelessly in connection with the phenomena of life, however useful it actually is in connection with inorganic phenomena. It is, therefore, nothing but a working hypothesis of limited useful application.

The third lecture begins with a brief discussion of the progress made by philosophy in discussing the ultimate validity of the physical and chemical conception of the universe; and it is shown that there is no ultimate validity in this account, so that we are quite free to employ another conception in interpreting biological facts. It is then shown that we do actually employ the fundamental working conception of living organisms as such, and that with the help of this conception we can bring order and intelligibility into biological investigation, and we are provided with a working hypothesis which is of the utmost practical value in biological work. This is illustrated by reference to the actual course of physiological investigation, and contrasted with the scientific impotence resulting from the adoption of the mechanistic theory, which is only capable of presenting the facts in a more partial or abstract manner.

It is also pointed out that the ultimate ideal of biology is to bring within the scope of biological conceptions even the phenomena which are at present interpreted as inorganic.

In the fourth lecture the phenomena presented by conscious organisms or persons have been considered. It is shown that the relation of a person to his surrounding world with which he is in contact through perception and volition is not a mere external relation, since his surrounding world is teleologically determined in relation to his organic life. It is a mere logical illusion to regard the world perceived as independent of its relations to us in perception and volition. The visible world around us is a world molded by our personality, and there is no other world. In scientific work we can abstract from, or disregard, the psychological aspect of things, but insofar as we do so we are dealing with abstractions. The relations of personality, mere organism, and matter are relations of increasing abstraction from reality. Just as the individual organism can only be understood as participating in a wider life, so the individual person exists only in participating in a wider personal existence. He can only realize his true personality in losing his personality as a mere individual. Personality is the great central fact of the universe. This world, with all that lies within it, is a spiritual world.

JELLIFFE.

The Journal

OF

Nervous and Mental Disease

Original Articles

REPORT OF A CASE OF CENTRAL AND PERIPHERAL NEUROFIBROMATOSIS*

By Peter Bassoe and Frank Nuzum

CHICAGO

Clinical History.—The patient, a boy fifteen years old, was first seen by one of us (Dr. Bassoe) in consultation with Dr. W. A. Phillips, of Evanston, Illinois, on March 23, 1914. The parents and their three other children are well. The maternal grandmother is said to have had a lump on the head and a maternal uncle has a small nodule on the forehead but enough facts could not be determined to learn whether these really were cases of molluscum fibrosum.

The boy had typhoid (?) fever in 1902 and measles in 1903. The first evidence of his nervous disease was in 1904, when at the age of five years he had an attack of pain in the right scapular region suspected of being of the nature of pleurisy but it was followed by a dragging of the left foot. From that time on he had similar attacks of pain in the right scapular region lasting from two weeks to three months and occurring about once a year. In 1909 eight eye muscle operations were performed for the relief of strabismus. A lump on the left side of the neck was noted at least three years before death, others more recently, while a large mass attached to the rectum had been discovered only a few weeks before our examination.

The final attack of illness began on December 20, 1913, like

* Read at the forty-first annual meeting of the American Neurological Association, May 6, 7 and 8, 1915.

the previous ones with pain beneath the right scapula, which
lasted for about two weeks and was followed by pain in the left
side of the abdomen, difficulty in emptying the bladder, and pain
and progressive weakness in the left leg. On account of the
scoliosis X-ray examination of the spine was made and was nega-
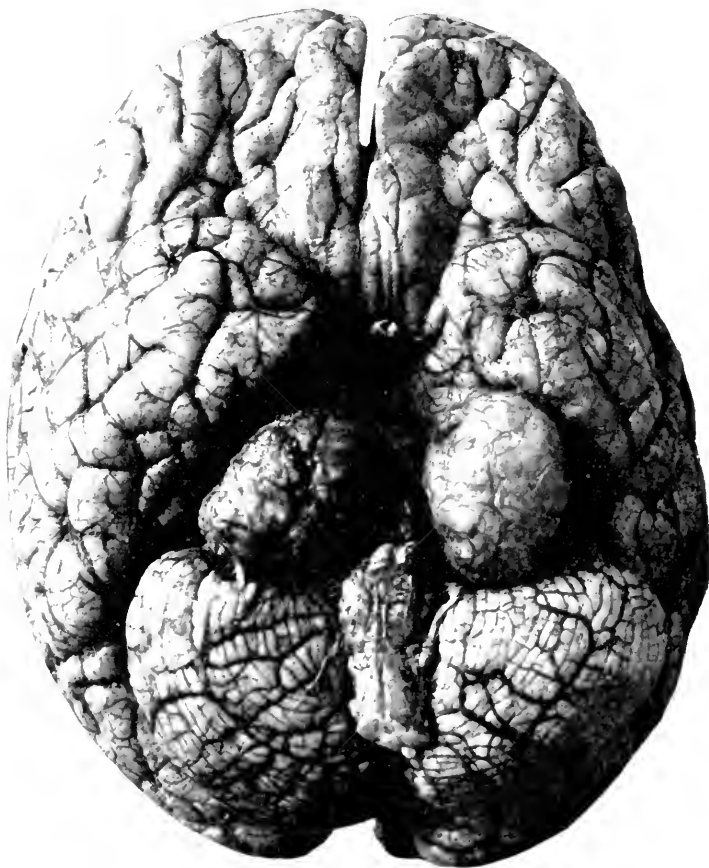
Fig. 1.   Base of Brain Showing Tumors in Both Cerebello-pontine Angles.

tive. About March 1 occasional choking during eating set in and
the pulse rate became accelerated, being usually above 100.   The
boy was bright and showed no mental abnormality at any time.

Examination on March 23, 1914.—The boy is very emaciated
and exhausted and can not talk above a whisper.   Subcutaneous,
movable nodules are seen on the left side of the forehead, on the

left side of the neck and on the chest. There is a well-marked dorso-lumbar scoliosis with convexity to the right. The patient can not raise his head from the pillow and the left leg is very weak. Passive movements of the lower extremities are painful. Smell and taste are normal and there is no important visual defect. The right external rectus is weak and the patient sees double when looking to the left. The corneal reflexes are absent and there is distinct paresis of both divisions of the left facial nerve. Hearing is much impaired in the left ear but good in the right ear. Ophthalmoscopic examination negative. The left knee jerk is absent and the right one weak. The ankle jerks and the cremasteric and abdominal reflexes are absent. The Babinski sign is present on the right side, while the left plantar reflex is normal. Tactile sensation is normal but pain and temperature senses are diminished on the anterior aspect of the left leg and in areas on the abdomen.

The patient gradually grew weaker and the choking attacks

Fig. 2. Large Tumor of Cauda Equina.

became more frequent. By the end of April there was evidence of increased facial nerve weakness on both sides, as both eyes would remain open.

The patient died on May 25, 1914.

The necropsy was held twelve hours after death by the writers.

Anatomic Diagnosis.—Multiple central and peripheral neuro-fibromata. Marked emaciation. Hypostatic hyperemia of the lungs. Passive hyperemia of the linings of the alimentary tract, urinary bladder, of the liver and spleen. Slight fatty changes in the kidneys. Accessory lobe in the left lung. Deep sacral decubitus. Inequality of the pupils.

The body is that of a very emaciated white boy 150 cm. long and weighing approximately eighty-five pounds. The head is well covered with long wavy brown black hair. The eyeballs are sunken. The eyes are blue and the pupils are dilated, the right more so than the left. There is no strabismus. The face is smooth and there are no evidences of a beard or mustache. The lips are pale and anemic. The teeth are all present, clean and in good condition.

On the left side of the forehead there is a flattened, irregular, oval, freely movable subcutaneous nodule 1.5 by .5 cm., the long axis parallel with the long axis of the body.

Just above the middle of the left clavicle, in the supraclavicular space, is another firm, somewhat movable nodule, 2 by 1 cm., which is not adherent to the skin.

Over the fourth intercostal space, just to the right of the sternum is a brownish, pigmented, slightly elevated annular area in the skin which is 2 cm. in diameter. In the same interspace and just beneath the nipple is a semicircular, movable subcutaneous nodule. Over the eighth rib on the right mid-clavic-
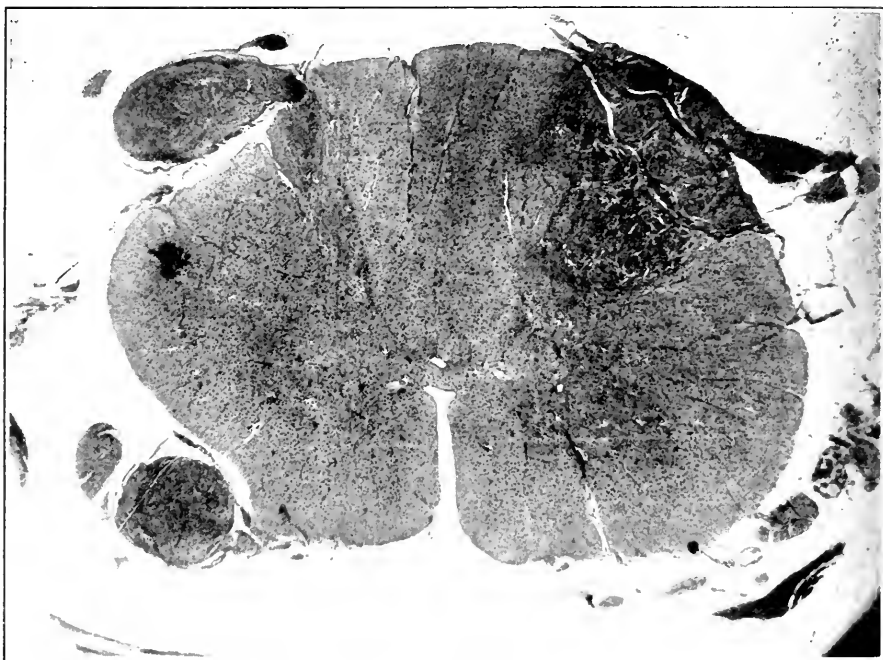
Fig. 3.   Fifth Cervical Segment Showing Tumor Growth in All Roots and
Invasion of Cord in Posterior Horn Region.

ular line is another oval, subcutaneous, firm nodule 1.5 by .8 cm. There are two similar nodules over the fifth interspace on the left anterior axillary line, the larger of which is 2 by 2 cm., the smaller .5 cm., in diameter.

Over the sacrum is a circular region of pressure necrosis 3.8 cm. in diameter and extending down to the fascia covering the sacrum.

There is a moderate scoliosis of the lower dorsal and lumbar portions of the spine, the convexity to the right, the deviation being 3.5 cm. from the mid-line of the body.

The testicles are in the scrotum and are equal in size. There are no scars on the penis.

The skeletal musculature is markedly atrophied. There are no evidences of injury either recent or old on the external surface of the body.

On opening the body the panniculus in the mid-line is trifling in amount. The abdominal viscera are normal in size and in their relation to each other. The foramen of Winslow is patent. The urinary bladder is empty and contracted. There is no free fluid in the pleural cavities. There are no adhesions in either the pleural or abdominal cavities.

The lungs are of normal size. There is a small accessory lobe on the upper lobe of the left lung. The pleura is everywhere
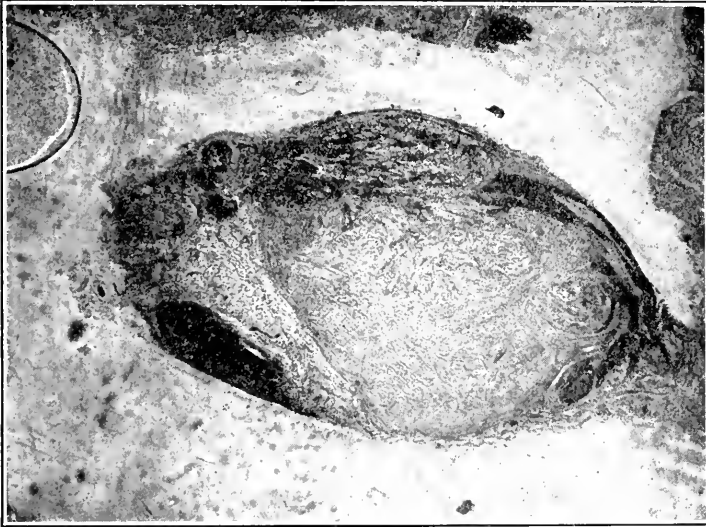
Fig. 4. Tumor of Left Fifth Lumbar Root and Ganglion. (Pal-Weigert Method.)

smooth and glistening. On sectioning the lungs a moderate hypostatic congestion is demonstrable in each lung, the pleura over these regions being darker than elsewhere. There are no further changes in the lungs other than those recorded in the anatomic diagnosis.

There is about fifty c.c. of clear serum in the pericardial sac.

The heart weighs approximately 240 gm. The apex is made up of the left ventricle. The epicardium is smooth and glistening as is the endocardium. The myocardium is in rigor mortis. There are no thickenings or other alterations of any of the valve leaflets. The foramen ovale is closed. There are no subendocardial hemorrhages.

On sectioning the myocardium and the papillary muscles no gross changes are found.

Careful examination of the stomach, intestines, liver, biliary appendages, spleen, kidney, ureters, bladder, prostate, pancreas or adrenal glands, no changes are found other than those recorded in the anatomic diagnosis.

There is a nodule beneath the pleura in the eighth interspace just to the left of the vertebral column which is 2 cm. long and .8 cm. wide and is adherent to the intercostal nerve in that space.
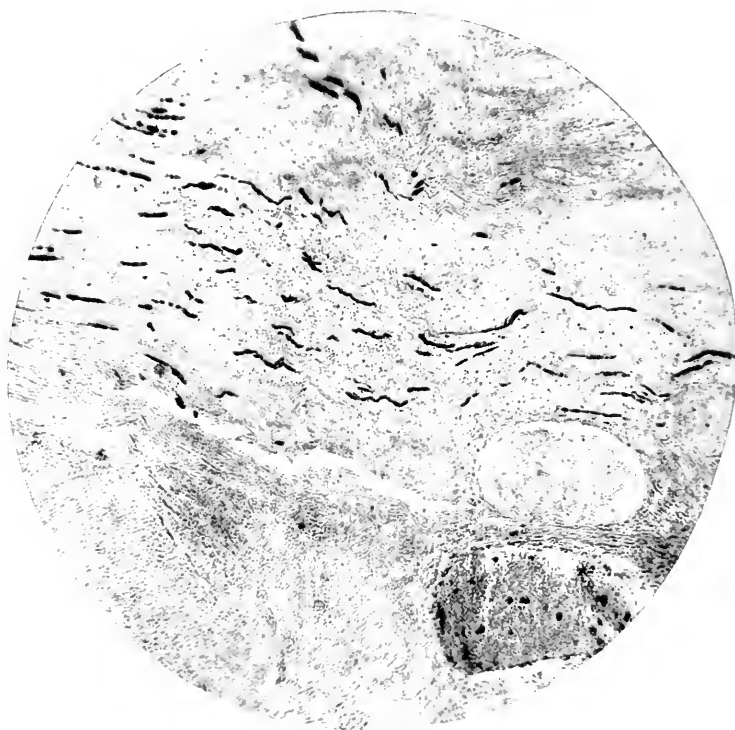
FIG. 5. Tumor in Left Cerebello-pontine Angle Showing Persistence of Medullated Fibers. (Pal-Weigert Method.)

There is a second large, irregular, nodular mass, made up of a number of smaller nodules, which lies in the hollow of the sacrum just posterior to the rectum. This mass is half the size of the fist and is not adherent to the sacrum. It is adherent to the serosa of the rectum but has not penetrated the muscular walls. There are no other nodules visible in the inner walls of the trunk cavities.

The brain weighs approximately 1,400 gm. There is a moderate edema of the pia over the vertex and over the temporal lobes. The pia is everywhere smooth and glistening and is not thickened. There is a firm, fibrous tumor in the left middle fossa, 4 by 3.5 by 2 cm. in its dimensions, which is intimately connected with the Gasserian ganglion.

There is a similar tumor in each cerebello-pontine angle, each the size of an English walnut. These tumors have caused depressions in the cerebral and cerebellar hemispheres which come in relation with them.
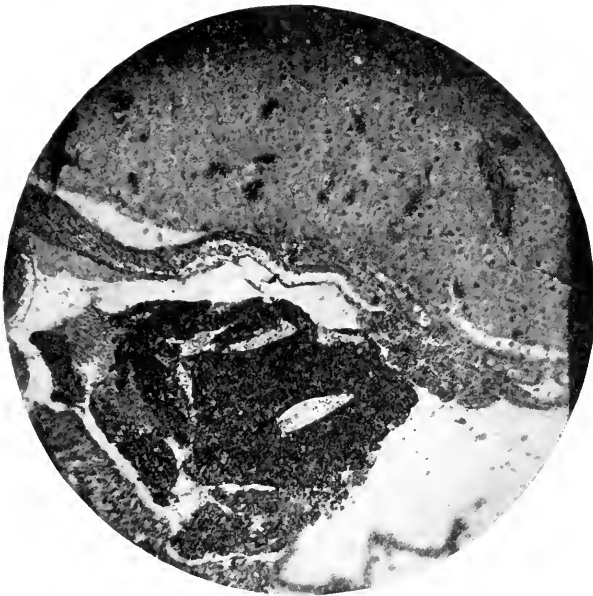
FIG. 6. Right Motor Area. Calcification about a Pial Vessel. Fibrosis of Underlying Cortex.

There is a small nodule .4 cm. in diameter connected with the left third nerve. There are numerous nodules varying in size from a split pea to a lima bean, intimately connected with the roots of the spinal nerves. There is one large tumor 8 cm. long and 2 cm. in diameter in the cauda which has caused marked pressure on the terminal filaments of the cord.

There are three nodules connected with the left vagus nerve, the smallest pea size at the level of the hyoid bone and the largest the size of a hazel nut, this being the nodule described just above the left clavicle. The third nodule is lima-bean-sized and is adherent to the larger nodule just described.

Histologic Examination.—*The tumors* present the same essential structure everywhere; namely, that of fibroma, often with a very whorl-like arrangement of the fibrous tissue (Figs. 3 and 4). No new-formed nerve fibers are seen but the Pal-Weigert method reveals the persistence of old ones in some of the tumors, especially those of the cerebello-pontine angles (Fig. 5).

The invasion of the cervical cord by the tumors arising from the posterior roots is well seen in Fig. 3. All of the anterior and posterior roots are more or less invaded by tumors at this level.

Fig. 7. Right Motor Cortex. Proliferation and Hyaline Degeneration of Fibrous Tissue.

The relation of tumor tissue and spinal ganglion is seen in Fig. 4 which shows the whorly fibrous mass to which the ganglion (left 5th lumbar) appears as merely an enveloping sheath.

More or less invasion of the roots is seen at almost every level. Pal-Weigert preparations fail to show any marked degeneration of the long tracts of the cord.

The Cerebrum.—Three interesting types of lesions deserve notice. (1) A pial artery outside the right motor cortex is entirely surrounded by a calcified area (Fig. 6). No calcification is found elsewhere in the body.

(2) Sections of the motor cortex show extensive proliferation of fibrous tissue about the vessels, many of which contain thrombi. Extensive hyaline degeneration is seen in the fibrous tissue (Fig. 7).

(3) Scattered diffusely through the cortex and white matter of the frontal, parietal and temporal regions are small groups of polymorphous, vesiculated cells which contain many fine dark granules and possess variously shaped nuclei usually placed at one side of the cell. (Figs. 8 and 9.)

Fig. 8. Left Temporal Lobe Showing Heap of Polymorphous Glia Cells (Low Power).

Cases like the one just reported are now fairly numerous in the literature and on the whole rather similar. The number of tumors within the cranial and spinal cavities is usually large. The experience of Hunt and Woolsey (1) of finding only one tumor in the spinal canal in a case of cutaneous neurofibromatosis is unusual. The fifth and eighth cranial nerves are those most frequently involved within the skull but when we include all the peripheral nerves the order of frequency seems to be: vagus,

abdominal sympathetic, sciatic. The intraspinal tumors usually arise from the roots, especially the posterior ones, and when the cord is invaded it is usually in the region of the entry of the posterior roots. The thoracic region of the cord seems to be the favorite site, but the largest tumors are apt to be on the roots of the cauda.

The affection of the cerebral cortex is particularly interesting. In our case two kinds of foci of disease are encountered, first the areas with hyaline proliferated vessel walls and peri-
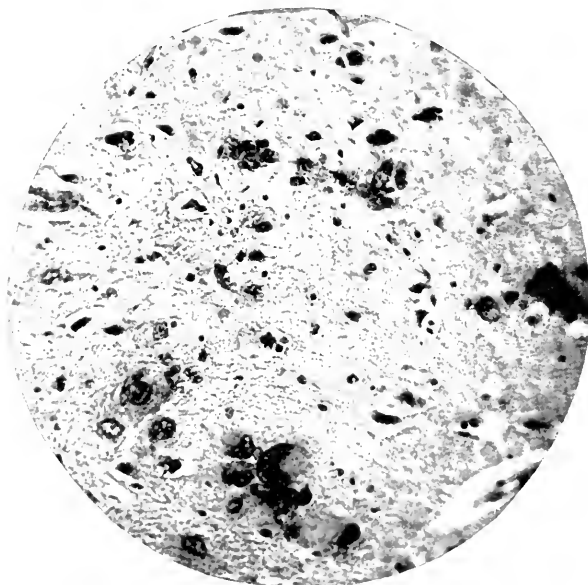
FIG. 9. Cell Heap in Left Frontal Lobe (High Power).

vascular fibrous tissue, secondly the minute areas containing polymorphous, rather large glia cells in heaps. The latter areas have given rise to much controversy since Bielschowsky and others (2) have suggested that they are identical with the lesions characteristic of the tuberous sclerosis of Bourneville. Both diseases, according to them, originate in malformations in the primitive neurogenic tissues, giving rise to so-called "blastomatous" processes which when affecting the sheaths of Schwann cause neurofibromata and when affecting the glia cause the multiple nodules of tuberous sclerosis.

Cutaneous lesions are almost constant features of both diseases, though not always similar in kind, and tumors in the interior of the body are common in both, but dissimilar. In tuberous sclerosis we are apt to find kidney tumors of the type of hypernephroma and embryonal muscle tumors of the heart while in von Recklinghausen's disease all the tumors usually have the structure of neurofibromata. The latter type of tumor has been found in almost every conceivable location, for instance in the stomach wall, causing pyloric stenosis, in the rectum as in our case and in one reported by A. B. Cooke (3) in which sixty tumors were removed from the rectum, in the adrenals (4), pharynx (5), etc. Imbecility and epilepsy are cardinal features of tuberous sclerosis but not of von Recklinghausen's disease, although mild psychic defects, such as "apathy, intellectual obtuseness and tendency to depression," are said to exist in a large proportion of cases, in sixty-three per cent., according to Charpentier (6). Returning to the small cell heaps in the brain we find them first described in two cases of von Recklinghausen's disease by Henneberg and Koch (7) who found them in the middle and deep layers of the cortex, the cells being very polymorphous, vesicular, filled with small dark granules, devoid of processes, and apparently with no relation to the vessels; then by Hulst (8), who found them in all layers of the cortex and in the white matter, and by Verocay (9), who also described hyaline changes like those found in our case. P. Nieuwenhuijse (10) recently reports three cases of tuberous sclerosis and one of neurofibromatosis with marked brain changes, and after sifting all the available material chooses to disagree with Bielschowsky and regards the two diseases as entirely distinct from one another. Bielschowsky in his most recent paper tries to refute all objections and describes the findings in a new case in which he seems to prove the glial origin of the large cells and he also points out the similarity of the cell heaps to those described by Alzheimer in pseudosclerosis. Right or wrong, any plausible effort at generalization is stimulating and interesting. This is the case with another one offered by Verocay (11) who concludes that the tissue of neurofibromata is not true connective tissue but a neurogenic embryonal tissue the specific cells of which are capable of producing ganglion cells, glia, and nerve fibers.

Hence the occasional occurrence of ganglion cells in neuro-fibromata and the observed association with glioma and syringo-myelia may be explained. Faulty development of this neuro-genic epiblastic tissue may cause abnormal growth processes in the adjacent mesoblast, giving rise to the familiar multiple fibro-endothelial tumors of the meninges of the cord and brain.

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POSTNATAL GROWTH OF THE BRAIN UNDER SEVERAL EXPERIMENTAL CONDITIONS. STUDIES ON THE ALBINO RAT[1]

By Henry H. Donaldson, Ph.D., S. Hatai, Ph.D. and H. D. King, Ph.D.

THE WISTAR INSTITUTE, PHILADELPHIA, PA.

This report deals with the growth of the central nervous system in the albino rat. The studies on which it is based have been made by Dr. Hatai, Dr. King and myself and have been published in part.

The object of the studies was to find how far the growth of the nervous system might be modified under several sets of conditions—some of which apply to man.

The growth changes have been followed mainly in the brain, by determining (1) its absolute weight, (2) its relative weight (in relation to the body), (3) the proportional weights of its parts, (4) the progress of myelination, (5) the percentage of water.

These determinations have been made after the rat had been subjected to various sets of conditions represented by domestication, inbreeding, disease, exercise, modified rations and gonadectomy.

For discussion the results are most conveniently arranged according to the experimental conditions which were either (1) indifferent, or (2) unfavorable, or (3) favorable in their effect, and they will be considered in that order.

1. *Indifferent Conditions.*—A quantitatively deficient but wholesome ration produces a small animal—with a brain absolutely small—but nevertheless proportional to the body in weight and with a myelin and water content normal to the age (Hatai, (11) (12)). Indifferent *in all respects* are inbreeding (King, MS.) (Hatai, MS.) and removal of the sex glands (Gona-

dectomy, Donaldson and Hatai (9), Hatai (13) (15)) although
in the last instance modifications appear in the endocrine system.
The age of the rats at the time of this operation was 30 days—
equivalent to 2.5 years in man (Donaldson (3)).

2. *Passing to the conditions which are unfavorable,* we find
that among these domestication produces the greatest effect. The
brain of the domesticated albino is 12 per cent. less in weight than
that of the wild Norway of like size (Donaldson and Hatai (10),
Donaldson (8)). In most other respects the brain is but slightly
modified—nevertheless a very notable arrest in growth is shown
by the olfactory bulbs and the flocculi (Donaldson MS.). This
arrest is shown by the accompanying models.

When a lipoid-free ration is used (Hatai (14)) the rat is
under size and there is a slight arrest (2.5 per cent.) in the rela-
tive growth of the brain—but much less than one would expect
from the defective character of the ration. In the first series of
such rats the males showed testes 44 per cent. less in weight than
those of the controls. It was thought that in some way the
testes might have been taxed to furnish lipoids to the nervous
system—but a second series of males *castrated before the lipoid-
free ration was used,* yielded brains just as heavy and complete
as those of the first series.

The growth of the brain on the lipoid-free ration is there-
fore independent of the changes found in the testes (Hatai (14)).

Again, where maize is used as the source of protein the growth
of the brain is unfavorably affected. Here too the olfactory
bulbs and the flocculi are especially affected, but the percentage
of water and the myelin formation follow the age (Holt. MS.,
Hatai, MS.).

3. *Conditions favorable for the growth of the brain* are found
in highly varied diets and voluntary exercise. The latter gives
a compact animal with generally heavy organs and an increase
of 2.5 per cent. in the relative brain weight (Donaldson (7),
Hatai, MS.).

Bringing these results together it appears that while inbreeding
and gonadectomy do not modify brain growth relatively or abso-
lutely—a deficient wholesome ration does give an absolutely small
brain, which however is *not otherwise* modified.

On the other hand the greatest modification (12 per cent.) is
found in the domesticated albino as contrasted with the wild

Norway. Much smaller unfavorable modifications (2.5 per cent.) are produced by disease (lung disease) (which also gives the greatest change, 0.5 per cent., in the water) (King (16)), by the lipoid-free ration and by the ration in which maize furnishes the protein. While in the last three instances the total undergrowth is less than 2.5 per cent., the undergrowth in the olfactory bulbs and the flocculi is much greater.

On the other hand favorable conditions may induce a slight overgrowth of the brain (2.5 per cent.).

In considering this series of results it must be remembered that the conditions represented by domestication act continuously and over a number of generations and thus are different from the remaining conditions which are not brought into play until the rat is about 30 days old.

Fixing attention on the experimental conditions which were applied at 30 days we note that these produce but little effect (plus or minus 2.5 per cent.) on the whole brain, nevertheless when unfavorable, induce much greater weight changes in the olfactory bulbs and the flocculi.

Several studies on the histological composition of the nervous system in the rats tested yield the following results. The number of neurones in the domesticated albino is the same as that in the wild Norway (Donaldson, MS.) hence the reduction in the brain weight of the albino is due to the smaller size of the neurones composing it. Moreover, in the case of the albino subjected to modifying conditions after 30 days of age, the number of neurones is *already complete* at this age, so that the changes induced are again merely those of size, unless some neurones should have been destroyed (Addison (1), Allen (2)).

If it is granted that we can apply the results of several of these studies to man, then it follows that gonadectomy does not modify brain growth—while disease and some defective diets do modify it unfavorably. On the other hand, exercise modifies it favorably. The changes induced are slight however. At the same time with a wholesome ration which is quantitatively deficient, we get a greater modification in absolute size.

If we except lung disease, which does modify the percentage of water (0.5 per cent.), two characters are never touched by the remaining experimental conditions; *i. e.,* the percentage of water and myelination. Both these growth characters are linked with

age, and both are highly resistant to external influences (Donaldson (4) (5) (6)).

Taken in their most general bearing, these studies show the very high degree of regulation in the brain during the last half of its growth period, *i. e.*, after 30 days, and serve to suggest also what may be expected to occur in the case of man.

By inference therefore the more profound changes so often shown by the human brain in its *size, proportions* or *chemical composition,* must require to produce them either conditions different in nature (systemic intoxications) from those here described or involving the alteration of a larger group of organs, or acting at an earlier age or perhaps satisfying several of these demands at once.

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EXTRA-PYRAMIDAL MOTOR DISTURBANCES. A REPORT OF A CASE WITH AUTOPSY. LENTICULO-RUBRO-CEREBELLO-OLIVARY DEGENERATION*

By John H. W. Rhein, M.D.

PROFESSOR OF DISEASES OF THE MIND AND NERVOUS SYSTEM AT THE PHILADELPHIA POLYCLINIC AND COLLEGE FOR GRADUATES IN MEDICINE, NEUROLOGIST TO THE HOWARD HOSPITAL.

The following case is cited as illustrating some previously undescribed anatomical conditions which may be looked upon as the probable underlying pathological basis for the extra-pyramidal motor disturbances.

M. D., æt. 43, was admitted to the Philadelphia Home for Incurables April 7, 1913, the chief complaint being partial paralysis of the right arm and leg.

Family History.—Mother died of consumption at the age of 44. Father's whereabouts unknown. One brother died of consumption, one sister of croup at the age of 1 year, and one sister of diphtheria at the age of 8. Three brothers were living and well. One sister was living and well. None of patient's relatives has any condition similar to hers. One aunt died of a paralytic stroke.

Previous Medical History.—She had measles and chicken-pox when a little girl but had never been sick otherwise with exception of a sore on the leg.

H. P. I.—Up to age of eight or nine years the patient was well in every way. She played with the other children and went to school. At the age of nine years she had a convulsion. She was lying on a sofa when she suddenly called out with pain. She thinks her father told her that she had been acting queerly for a week or two previous. She does not remember whether she was unconscious or not. The left arm was paralyzed. She never recovered the use of her arm. She was not sure to what extent the face and leg were affected.

She was admitted to the Philadelphia Hospital on March 8,

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From the Home for Incurables and the Laboratory of Neuropathology of the University of Pennsylvania.

1905, at which time her condition was as follows: Patient was small in stature and well nourished. The occipito-frontalis muscle was held in contraction most of the time causing the brow to be wrinkled. She could frown and open and shut her eyes well. Pupils were equal and reacted to light sluggishly and in accommodation. There was an opacity on the left cornea due to an old ulceration. The movements of the extra-ocular muscles were good. On attempted convergence the left eye diverged.

She could not close her lips completely because the upper jaw protruded and the upper lip receded from the teeth. The lower jaw was small and did not approximate with the upper. When the mouth was closed the front teeth on the lower jaw were about half an inch posterior to the front teeth on the upper jaw. The tongue was protruded in the median line when the mouth was opened. When the patient talked she opened the mouth widely and "mouthed" her words. Her speech was difficult to understand. Her articulation was poor especially for labials. Her mentality was good.

Muscular power in the right arm and both legs was good. In the left arm the power in the biceps and triceps was fair. The left forearm was held in a position of semi-flexion on the arm. The wrist was flexed on the forearm. The third, fourth and fifth fingers were greatly flexed; the tips lying on the thenar eminence. The forefinger and thumb were also flexed so that the tip of the thumb touched the end of the forefinger. The muscles of the left forearm and hand were contracted. The fingers and hand on the left side were small as if they had not developed. The forearm could be fully flexed on the arm but could not be fully extended because of the contracture of the biceps tendon. Motion of the left shoulder was slightly restricted in all directions but this was not very marked. The fingers and wrist on the left could be moved only slightly. The left foot was held in position of talipes equinus.

The great toe was held markedly extended while the other toes semed to be flexed. The musculature of the leg was good.

Reflexes: The biceps jerk and triceps jerk on the right side were normal. On the left the triceps jerk was normal; the biceps jerk could not be elicited because of the contracture. The right knee jerk was quick and somewhat increased. The left knee jerk was increased but not as much as the right. Stroking either sole caused flexion of all the toes. Ankle clonus was not present.

When the patient attempted to move either member of the paralyzed side regular clonic contractions of the muscles developed. In the arm the biceps was sometimes involved, causing the forearm to move back and forth. More often the hand alone was involved. The fingers shook and the forefingers and thumb executed the pill-rolling movement seen in paralysis agitans.

When the leg was held up and the patient told to flex it at the
knee the leg moved up and down. These involuntary movements
were increased when the patient attempted to move the part.
They were often but not always present when the member was
still.

Coördination: In the right arm this was good. While lying
in bed coördination with right leg was good. When the patient
attempted to put the left heel to the right knee the movements de-
scribed above commenced and made the act difficult. When the

Fig. 1. A, Degenerated left nucleus dentatus. B, Normal right nucleus
dentatus. C, D, Degenerated olives.

patient stood with feet together with the eyes open or closed she
fell backward. Her gait was not ataxic. In walking she kept the
great toe on left side extended. She limped on right side. This
was due to a painful leg ulcer, now almost healed, on the right leg.
She had a scar of an old ulcer on the left leg. Sensation to touch
and pain was normal.

The chest was well formed. No adventitious sounds were
heard in the lungs or the heart. The liver and spleen were
normal. The abdomen showed no abnormalities.

The examination a month before she died, May 3, 1914, at the Philadelphia Home for Incurables resulted as follows: The lower jaw was retracted, all of the upper teeth showing, and the mouth was held open. She could not entirely close the mouth on account of the retraction of the lower jaw. The tongue was protruded in the median line. The speech was somewhat indistinct and spastic. It was not noted whether there was any difficulty in swallowing.

There was a rhythmical contraction of the masseter muscles and also the muscles about the mouth. There was no facial paralysis. The pupils were equal and reacted to light and in accommodation.

The left arm was in a state of contracture. The forearm was flexed upon the arm, the hand flexed upon the forearm with the fingers partially flexed. The left leg was held in an extended position, the foot in talipes equinus position, there being contracture of the tendo Achillis. There was some rigidity also at the knee joint. The big toe was hyperextended.

The right arm and leg were moved freely and showed no spasticity or contractures.

There was present a tremor in the left arm. In the hand the tremor was characteristic of the pill-rolling tremor of paralysis agitans. It was rhythmical and it temporarily disappeared when the fingers were extended by the examiner. There was a constant to and fro tremor of the left foot which was also temporarily quieted by extension of the foot.

Measurements of the arms and legs on both sides showed a moderate degree of atrophy of the arms, forearm, thigh and calf on the left side. The circumference of the upper arm on the right side was 18½ cm., on the left side 16 cm. The circumference of the right forearm was 19½ cm., the left side 19 cm. The circumference of the right thigh was 38 cm., of the left 35 cm. The circumference of the right calf was 29 cm., of the left calf 27 cm.

The knee jerks were increased on both sides but more so on the left. There was neither ankle clonus nor Babinski on either side. The biceps jerk on the left was increased in the arm, on the right side was present but not exaggerated. She was able to walk with a hemiplegic gait until general weakness from a malignant growth in the pelvis sent her to bed a month before her death.

At the autopsy a large mass occupied the pelvis involving the uterus, rectum and intestines. The tumor appeared to be a cancer. The brain and spinal cord were hardened in formaline and the basal ganglia, pons and medulla oblongata were cut in serial sections. Sections were also made from the paracentral regions and the spinal cord.

On section the brain showed no gross lesion except in the lower portion of the lenticular nucleus on the right side—which was the seat of space formation. The area was small and occupied the posterior portion of the inferior levels of the putamen.

At a level corresponding to Fig. No. 230 in Dejerine the red nucleus was normal on the left side. The lenticular nucleus, the internal capsule, the anterior pillars of the trigone and the anterior commissure appeared to be normal. On the right side the red nucleus was ill-defined and approximately $\frac{1}{3}$ to $\frac{1}{2}$ smaller than the left red nucleus. Microscopically there was partial de-
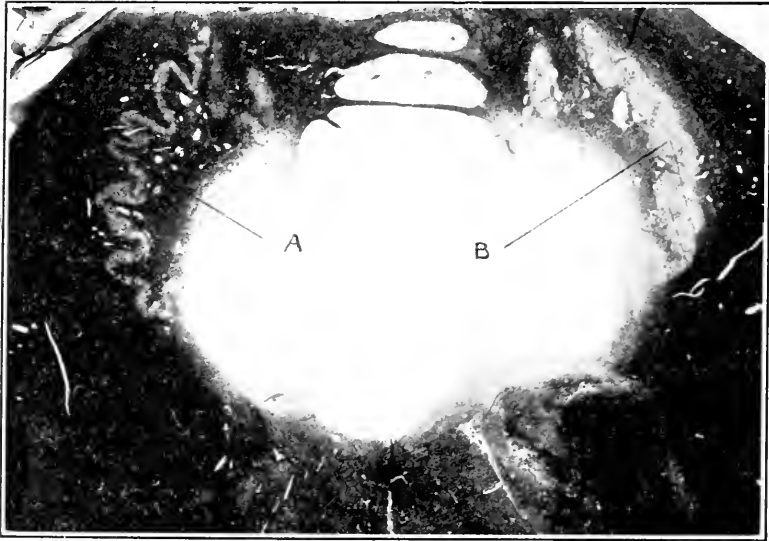
Fig. 2. A, Normal right nucleus dentatus. B, Atrophied left nucleus dentatus.

generation of the fibers. The ansa lenticularis stained less well on the right side. On the outer side of this, a small tract of degeneration could be traced as far as the capsule of the red nucleus. The right retro-lenticular segment of the internal capsule stained less well than on the left side. The fibers which surrounded the red nucleus stained poorly especially on the inner surface. The left corpus Luysii was a little smaller than on the right side.

A little lower several lacunæ were observed in both lenticular nuclei but otherwise nothing abnormal was observed in the basal ganglia. The thalamostriate fibers stained well on both sides.

The ansa lenticularis on the right side stained better than in the section above but still less well than on the left side. The right red nucleus was smaller than the left, and the fibers around it still stained poorly. The caudate nucleus was normal and the anterior commissure stained normally.

Still lower on the right side numerous lacunæ were observed in the first and second divisions of the lenticular nucleus, these consisted of perivascular spaces but they did not give rise to any degeneration of the neighboring fibers.

In the section corresponding to No. 231 in Dejerine, the ansa lenticularis stained poorly still. The right red nucleus was still smaller than the left. There was nothing abnormal otherwise.

In the section still lower on the right side the internal and external layers of the lenticular nucleus stained poorly and were very vascular. The space formation was quite apparent on both sides but only on the right side was the staining poor.

At a level still lower the third segment of the lenticular nucleus on the right side was much smaller than on the opposite side and presented in its posterior aspect, space formation. Under the microscope this consisted of perivascular distention in which were several blood vessels and also space formation. In these spaces there were contained some compound granular cells and these were present also in the adjoining tissue and in the walls of the cavity. There was some blood pigment observed in the spaces. There were also several blood vessels. In places by the Weigert stain were observed some degenerated fibers. This area was situated just externally to the anterior commissure.

At the lowest level this area in the lenticular nucleus appeared to be smaller in extent and was still limited to the posterior portion of the third division of the lenticular nucleus. It was only present on the right side and began first to be observed at the level corresponding to where the second nerve begins to make its appearance in horizontal sections.

Cerebellum: The left dentate nucleus was much smaller than the right and microscopically showed great diminution of fibers. On the right side the dentate nucleus stained well. In the medulla oblongata the right olive was completely degenerated in this section. There was some degeneration also in the left olive but much less than on the right side. The left restiform body was much smaller than the right.

The left dentate nucleus measured 7 mm. in length and the right measured 12 mm. in length. The left dentate nucleus was much smaller therefore. Under the microscope there was an absence or diminution of nerve cells and the fibers within the nucleus were very sparse. The atrophy however was apparent at all levels. Higher up the atrophy was less apparent but there still the nerve cells were fewer and the fibers not so numerous as on the opposite side.

The nucleus emboliformis was about equal in size on both sides. The corpus justa-restiforme stained less well on the left side than on the right. The internal semicircular fibers were atrophied or took the stain poorly on the left side. The left median lemniscus was a little larger than the right.

The pyramids were normal in size in the pons. The fasciculus longitudinal is posterior stained well on both sides but was smaller on the right side. The superior cerebellar peduncle stained less well on the left side and was smaller than on the right. The tegmentum was degenerated on the right side.
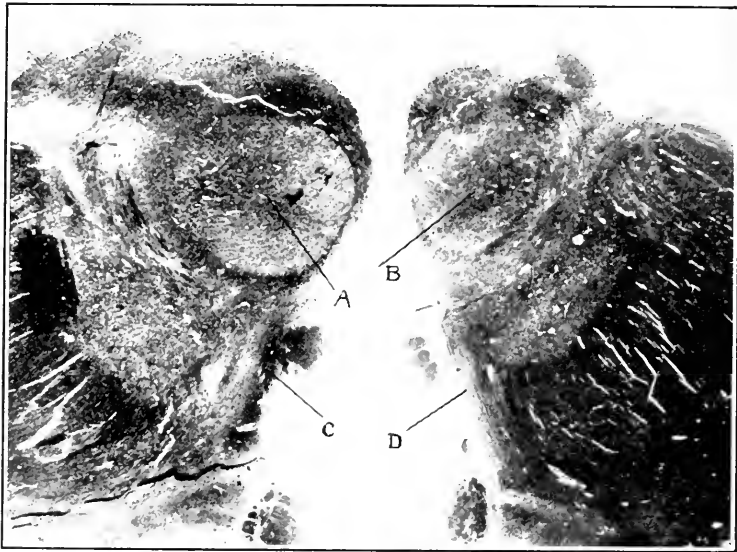
FIG. 3. A, Normal left nucleus ruber. B, Atrophied and degenerated right nucleus ruber. C, Normal tract to be compared with corresponding area on opposite side. D, Degenerated tract going to nucleus ruber and connecting with degeneration of ansa lenticularis.

At a lower level the right olive showed an entire absence of fibers. There was also some degeneration in the inferior part of the left olive. Both pyramids stained well. The left restiform body was still smaller than the right.

At a level higher up, the left dentate nucleus stained with difficulty especially the fibers around it, mainly externally, and internally to a less degree. This was in marked contrast to the right side which stained in a sharp cut manner. These fibers it will be remembered connect with the opposite lower olive and are termed "Vlies." The cortex of the cerebellum showed intact Purkinje cells and in normal numbers.

The nucleus tecti appeared to be equal in size on each side.

At a little higher level the superior cerebellar peduncle was smaller on the left than on the right. The right red nucleus was still much smaller than the left. The median lemniscus was of the same size on the two sides.

At a still higher level the superior cerebellar peduncle before its transition into the red nucleus was still much smaller on the right side.

In the left paracentral region the several layers of cells stained well. In the right paracentral region some of the cells showed yellow pigmentation. The Betz cells stained normally. The other cells could be defined clearly and stained well. The same findings were observed in the right paracentral region.

The pia was somewhat thickened but nowhere can be seen any round-cell infiltration.

The spinal cord at all levels stained well and showed no degeneration in any of the tracts. The cells in the anterior horns stained by Nissl method showed in places increase in yellow pigment but otherwise no noteworthy change was observed.

In the thoracic region the same condition obtained but some cells in the left anterior horn were atrophied, taking the stain poorly.

In the lumbar region the cells of the anterior horn showed some degeneration consisting of atrophy of the pigment, displacement of the nuclei and swelling of the cell body.

The pia of the cord was somewhat thickened but presented no evidence of round-cell infiltration at any levels.

There was a small area of intense degeneration in the left optic thalamus.

Résumé

The patient, a woman of 43, became paralytic in the left arm and leg at the age of eight and remained in this condition until the time of her death.

Symptoms at the time of death consisted of paresis of the left arm and leg, contracture of the Achilles tendon and spasticity of the knee joint, contractures at the shoulder joint, flexor contractures of the left elbow and wrist, retraction of the lower jaw, indistinct and spastic speech, moderately fine, rhythmical tremor in the left arm and leg and tremor of the jaw; increased knee jerk more on left without Babinski phenomenon or clonus. The right side was unaffected.

Pathologically there was a lesion of the right putamen in its inferior and posterior portion; degeneration of the right ansa

lenticularis, right red nucleus, left superior cerebellar peduncle
and left dentate nucleus. The left inferior olive was totally de-
generated, the right to a slight degree and the right corpus resti-
forme was smaller than the left.

This case, I believe, shows what has already been described
but not histologically proved, viz., an anatomical connection be-
tween the dentate nucleus through the superior cerebellar peduncle
with the contralateral red nucleus.

Our present knowledge of the anatomy of these tracts and
centers is as follows: From the red nucleus it is well known that
fibers go to the optic thalamus. From the red nucleus there is a
descending tract leading down to the anterior horns, the fasciculus
rubrospinalis.

Jacob (1) stated that the red nucleus was a motor organ for
the transmission of direct cerebellar impulses and perhaps also
for those coming from the lenticular nucleus by way of the
lenticular loop to the red nucleus, but added that the histology
of this tract had not yet been demonstrated.

Fibers go from the lower olive to the contralateral restiform
body and some to the restiform body of the same side. Some
fibers go to the raphe. The fibers of the restiform body pass
lateral to the spinal fifth root. Mingazini has described these
fibers as the retro-trigeminal and inter-trigeminal cerebello-olivary
fibers.

From the olive, fibers go to the cerebellum on the opposite side
and to the same side. Some go to the central tegmental tract of
Bechterew. Obersteiner (2) believes that in this tract there is a
direct connection between the basal ganglia (perhaps the len-
ticular nucleus) and the lower olive. Fibers in the spinal portion
of the restiform body go to the vermis, while in the olivary
portion are found chiefly fibers which surround the corpus denta-
tum, known as the "Vlies."

The possibility of a connection between the lenticular nucleus
and the rubro-cerebellar tracts has therefore been a matter of
discussion—though this has not to my knowledge been ana-
tomically proved.

In my case there is evidence to show that there exists a con-
nection between the lenticular nucleus by way of the ansa lenti-
cularis with the red nucleus and opposite dentate nucleus. This
case also demonstrates a tract connecting the dentate nucleus by

means of the vlies with the lower olive on the opposite side mainly and to a less extent on the same side.

These connections are, I believe, the underlying pathological basis for extrapyramidal motor disturbances. This case seems to be a clear-cut illustration of this view. For in my case there was clearly made out degeneration in the right putamen, ansa lenticularis, nucleus ruber and opposite superior cerebellar peduncle and dentate nucleus. Furthermore a degeneration could be traced in the fibers surrounding the dentate nucleus of the restiform body and in the olives.

In the cases in which the lenticular nucleus alone or the lenticular nucleus and the ansa lenticularis are implicated as in Wilson's (3) cases, there is a break in the chain of connections from the lenticular nucleus to the dentate nucleus by way of the red nucleus and from the dentate nucleus to the lower olives and hence the symptoms are anatomically explained. This tract is located probably in the lower part of the putamen, as in my case, which may explain why all lesions of the lenticular nucleus do not give the same symptom complex.

This case is unique at least pathologically. Clinically the left-sided paresis with tremor, the retracted jaw, the dysarthria, the contractures, the rigidity present symptoms in the nature of a unilateral lenticular degeneration. Wilson's cases are bilateral however, and differ further from my cases in the duration of the disease and slowness of onset, and pathologically, in the absence of degeneration of the red nucleus, superior cerebellar peduncle, dentate nucleus and olives.

There have been for a number of years cases reported in the literature presenting symptoms of paresis of the extremities associated with spasticity, contractures, tremor, choreiform movements or athetosis without involvement of the pyramidal tracts. In other words there is a well-recognized group of cases presenting disorders of motion which are extra-pyramidal in origin. In cases of this character the symptoms may be confined to one side or may be bilateral. The cases illustrating the first type are those described by Marie and Guillain (4), Landouzy (5), Demange (6), Eisenlohr (7), Halben and Infeldt (8) and myself (9) (in a previous communication) and in the case described in this paper. The bilateral type has been elaborately described by Wilson comparatively recently under the title of "Progressive Lenticular

Degeneration." The latter cases in which autopsy has been made
are not numerous.

In the former the pathology consists of a lesion of the len-
ticular nucleus as in cases of Landouzy (one-sided lenticular
lesion without pyramidal tract involvement), Demange (bilateral
lenticular hemorrhage) and Eisenlohr (bilateral lenticular dis-
ease). In the cases of Halben and Infeldt and Marie and Guil-
lain the red nucleus was degenerated and in my own case described
in a former communication no lesion whatever was found.

The sites of the lesion in the cases giving rise to involuntary
movements as illustrated in the study of the pathology of this
group of cases are then the basal ganglia, the red nucleus, the
superior cerebellar peduncle, the dentate nucleus and the lower
olive. These can be looked upon as extra-pyramidal pathways
and the explanation of the disturbances of motion can be looked
for in these localities.

Wilson believes that responsible for these disturbances of
motion is necessary a destructive lesion which removes the normal
inhibiting or steadying influence which the corpus striatum exer-
cises over the cells of the anterior horn. As the result of this he
states in these cells this inhibition is impaired and the more the
pyramidal path becomes innervated the more apparent is the
tremor. An intact pyramidal tract is therefore necessary. He
further states that the absence of this inhibitory quality of the
lenticular nucleus may be felt by way of the strio-thalamic fibers
or the external part of the optic thalamus and thus by way also of
the intermedio-precentral and precentral cortex. Thus, a double
action of the corpus striatum on pyramidal innervation may be
brought about. In his cases there was no definite lesion found
in the cerebello-rubro-thalamo-cortical system. He however
acknowledges a dynamic modification of the functions of the
rubro-spinal system caused by a defect of the nervous influx from
the lenticular nucleus. The removal of the lenticular inhibition
allows the cortical motor cell to react in such a way that there is
increased tonicity of the muscles reached by the pyramidal tract.
The removal of the steadying (or inhibitory) influence on the
anterior horn cell which is exerted by way of the red nucleus ac-
counts, he thinks probable, for the tremor.

Wilson's theories, while satisfactory for his own cases, do not

explain tremors and hypertonicity in all the cases of extra-pyramidal motor disturbances at least anatomically.

The position recently taken by Dr. C. K. Mills (10) as explaining the occurrence of extra-pyramidal motor disturbances is supported by my findings. He states that the three essential qualities of motor innervation are energy, tone and synergy.

Tone is necessary for the rhythmetization, both of voluntary and involuntary movements, synergy in order that toned movements shall be grouped for the performance of acts which require special adjustments. Tone integrated in the striatum unites with cerebellar synergia through the intermediation of the cerebello-rubro-thalamo-cortical apparatus and the cerebro-rubro-spinal apparatus. If the cerebellar influence is withdrawn asynergic movements are the consequence. If the tonectic excitations from the striatum are withheld hypertonicity and involuntary movement result.

Mills believes therefore that tone belongs to the cerebral cortex, and that the cerebral tonectic apparatus has cortical areas of representation and chiefly mid-frontal. The corpus striatum, according to his view, is an association or integration region where the excitations from the different cortical tonectic zones are regrouped. He further believes that the cortical zone and the striatum are connected by association fibers. "The projection fibers, as has been shown, to pass through the frontal cortex to the striatum probably pass through the caudatum and pallidum on their way to the thalamus, subthalamus or ruber."

That morphologically the striatum is part of the cortex is generally accepted. (Wilson does not admit this.) The striate nuclei may be looked upon, he believes, as cortical regions closely related in function with the mid-frontal or mid-frontal and part of the pre-frontal cortex. Two motor projection systems must be recognized in order to explain the phenomena of movement in this relation to cortical activity. First of these is the pyramidal system, the second "must be postulated for the non-striated or smooth muscle system in so far as this is activated by cortical processes which result in the combination of skeletal and non-skeletal movements."

The observations of Wilson, he states, show a direct connection by way of the ansa lenticularis with the nucleus ruber. Mills's case seemed to indicate a similar connection and in addi-

tion one between the nucleus caudatus and the nucleus ruber.
There is not improbable a reflex arc by way of this thalamo-
strio-rubral path.

"In the facts presented in the study of the case here recorded
in detail are some indications, at least, of a caudate syndrome as
distinguished from that resulting from lesions confined to the
lenticula. Very briefly stated this symptom complex included
hypertonicity and tonectic paresis as exhibited especially in the
phenomena of involuntary painful emotional expression and
various symptoms referable to the cortico-autonomic nervous
system, vasomotor and secretory affections, disturbances of tem-
perature, pulse, respiration and of various forms of glandular
activity. It will be recalled that the necropsy and microscopical
examination showed that the right nucleus caudatus and the
anterior limb of the right internal capsule had disappeared, while
the head of the left nucleus caudatus, although much atrophied,
did not show more than one half the destruction of its fellow on
the right, and the anterior limb of the left internal capsule at
higher levels was intact. Both the nucleus subthalamicus and
nucleus ruber were about one third smaller on the right than on
the left. This greater degeneration of the right nucleus sub-
thalamicus and nucleus ruber may have been related to the
complete destruction of the right nucleus caudatus and anterior
capsule."

We still have cases where the lenticular lesion is absent or
small as in my own case and where the chief pathological process
is to be found in the rubro-cerebellar and cerebellar-olivary tracts,
as in my own case and in the cases of Halben and Infeldt and
Marie and Guillain. In Halben and Infeldt's case there was a
left ophthalmoplegia, right hemiplegic muscular spasms, hemi-
chorea and epilepsy with increased knee jerks and absent Babinski.
The pyramidal tracts were intact and there was no lesion of the
lenticula or its fibers. The red nucleus was destroyed, as well as
Forel's Haubenfeld, the white nucleus and the median and ven-
tral part of the Hauptschleife. The olive on the same side was
smaller and the opposite dentate nucleus was reduced in size and
the cells smaller and diminished in number and the vlies was
paler.

Marie and Guillain in 1903 described an old lesion of the red
nucleus in a patient who developed at the age of two, after con-

vulsions, a left hemiplegia. When examined at the age of thirty-six there was a left hemiplegia with arrested development of the left side of the face, trunk and limbs. There was also constant movements of flexion and extension of the fingers and thumb. The forearm was flexed upon the arm and the arm adducted and abducted upon the chest. The head was inclined to the left shoulder. There was some diminution in volume of the left side of the tongue. Sensation was intact. The right pupil did not react to light or accommodation and there was right divergent strabismus.

There was a lesion in the right red nucleus. The foot of the peduncle was normal. There was considerable atrophy of the left cerebellar peduncle which could be traced to the dentate nucleus. The posterior longitudinal bundle on the right side was also atrophied. The reticular substance was almost entirely absent. Although the foot of the peduncle was more intensely colored on the right than on the left there was no appearance of degeneration. There was an atrophy of the right olive. The fibers of the capsule of the olive and the cells were diminished, explaining the atrophy of the cerebellar olivary fibers. Helweg's tract did not seem to be degenerated. The hilus of the left dentate nucleus was very much atrophied. They could not find any degeneration of the tract of von Monokow. The lenticular and other basal ganglia were not mentioned in this report.

The contribution of Dejerine and Thomas (11) has a bearing upon this subject. They described in 1900 a disease which they called "atrophie olivo-ponto-cerebelleuse" and reported a case with autopsy and a clinical case. The case with autopsy was a woman of fifty-three who died at the end of two years and eight months after the onset of the disease, which consisted of disturbed equilibrium in standing and walking, jerky speech, an awkwardness in handling heavy objects, a tremor upon using a pen and oscillations of the eyeball when looking upwards. The knee jerks and arm jerks were increased, there was no Romberg sign, no paralysis nor sensory disturbances. There was atrophy en masse of the cerebellar cortex which was more marked in the hemisphere than in the vermis. There was also degeneration and disturbances of most of the afferent and efferent fibers of projection and atrophy of the principal nuclei of origin of the afferent fibers. The lower olive and pontine nuclei were atrophied. The dentate

nucleus was relatively well conserved. Fibers of the cerebellar peduncle stained well. Both medullary olives and the juxta-olivary nuclei were extremely atrophied in all their diameters, more marked on one side. The superior external segment of the internal arciform fibers were entirely atrophied. The middle cerebellar peduncle was totally degenerated and all the nuclei of the pons had disappeared. The trapezoid body and the superior olives and the lateral lemniscus were intact. The superior cerebellar peduncles were not degenerated. The red nuclei were very small but symmetrical. One cerebral peduncle was smaller than the other but colored well. There was very pronounced atrophy of the arciform fibers and the restiform body. The pyramidal tracts were intact. The cells of Purkinje had disappeared. This case is quoted because of its relation, although not very direct to the pathology of my case. It is similar however in this respect. The olives in my case were degenerated more on one side and there was degeneration of the opposite restiform body. In the cerebellum the lesion in Dejerine and Thomas's case consisted of a cortical atrophy, while in my case the lesion in the cerebellum was confined to one dentate nucleus. In my case the superior cerebellar peduncle was degenerated, also one red nucleus and the ansa lenticularis. In Dejerine and Thomas's case the lesion was bilateral. In my case the lesion was distinctly not symmetrically bilateral.

It seems to me that we must look upon the cerebellum as exerting a great influence upon the development of these symptoms. The cases of Guillain and Marie, Halben and Infeldt, the case described by Dejerine and Thomas as olivo-ponto-cerebellar-atrophy and my own case, would seem to me to indicate that the explanation of the phenomena must be closely related to disturbances of the cerebellar function. My own case would indicate that this disturbance of function is in connection also with the lenticular nucleus for it will be recalled that although the lesion was small the ansa lenticularis was in part degenerated on the same side. This was related to the atrophy of the red nucleus also on the same side and the superior cerebellar peduncle and dentate nucleus on the opposite side, also with the degenerated cerebello-olivary fibers connecting the right lower olive with the opposite dentate nucleus by way of the restiform body.

It would appear from this study that this case testifies in a

clear-cut manner to the views held by Dr. Mills and also anatomically demonstrates the connection between the lenticula and the rubro-cerebellar system.

It would seem apparent that an intact cortico-lenticulo-rubro-cerebello-olivary tract is essential to explain proper motor regulation. I believe that it would not be going too far to assume that any break in this chain whether it be cortical or elsewhere in this tract could give rise to spasticity, paresis, contractures, and tremor or other disturbances of motion characteristic of extra-pyramidal motor disturbances.

I am indebted to Prof. W. G. Spiller for his kind assistance in the study of the sections.

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MENTAL DISTURBANCES IN THE FEEBLE-MINDED.[1]

By William N. Bullard, M.D.

In 1912 I called attention to certain mental symptoms in some of the feeble-minded which in the opinion of the officials in this state rendered them suitable subjects for care in the state hospitals for the insane. The symptoms described appeared so closely connected with their feeble-mindedness as to form an essential part of their condition and to be rather integral increases, exacerbations or progressive developments of their peculiar mental syndromes than an intercurrent or synchronous accidental affection engrafted on an enfeebled brain. That these symptoms formed such definite part of the general mental condition of these patients is corroborated by the fact that they are found to a lesser degree in a large proportion of the feeble-minded. It is only, however, when they have reached a certain degree of acuteness or severity that the patients become suitable subjects for the state hospitals for the insane.

The fact of the great temporal irregularity of the acuter and more violent symptoms, that the accesses or attacks occur with such various lengths of intermission or remission, and that in most cases no sufficient exciting cause for the advent of such conditions can be found, leads to the conclusion that a careful observation over a considerable length of time is usually necessary before the physician feels justified in placing a given case with the insane or in a state hospital for the insane. A patient often has intermissions of months between attacks. The attacks themselves are sometimes violent, acute and limited in time, but in other cases a peculiar mental condition which precedes, follows or accompanies such attacks may last for weeks or months, or the patient may have series of attacks at short intervals with remissions rather than intermissions.

It is noticeable that a change of surroundings and conditions

often—we may even say usually—causes a cessation, sometimes for months.

The character of these attacks is quite distinctive. In a feeble-minded person who shows only the ordinary conditions of feeble-mindedness or idiocy, who has been in a comparatively calm and quiet state of mind, not markedly differing from the usual or normal condition, in these cases a sudden outburst of violence or temper occurs without any exciting cause sufficient under ordinary conditions to produce such an effect. "At irregular periods a change takes place in the mental atmosphere of these patients" and they become violent or maniacal. They scream, strike, kick, bite, destroy clothes and furniture, break windows and often require forcible restraint. They are obscene and profane. After a day or more the more violent symptoms usually cease and the patients return to a more normal condition.

This is the typical attack. It is modified chiefly in the prodromata and in the continuation or cessation of morbid mental conditions. These attacks sometimes come, as far as is observed, spontaneously. A cause for irritation, anger, or indignation, is often given by the patient, but such cause would not be sufficient to produce these effects in the patient's ordinary condition. It is clear that the mental condition must have been at the time unusually unstable and morbid, different from what is the average or ordinary for this class (feeble-minded). This is shown also by the fact that in many cases there seem to be definite prodromata in the form of peculiar mental conditions which the patients recognize but often find it difficult to describe. They state that they feel "queer" and "not like themselves." Sometimes they do not themselves seem to recognize any change, but this is shown objectively by listlessness, indifference, unusual actions, and finally by irritability and restlessness preceding the outbreak. This change in temperament may be noticed only shortly before the attack or may be apparent twenty-four or forty-eight hours or more preceding it.

It seems probable that if all these patients were under close observation that in a very large proportion, if not all the cases, the outbursts could be predicted.

After an attack or series of attacks of this character, the patient often returns to his ordinary mental condition, quiet, good, helpful and not complaining. On the other hand a sort

of "Dämmerzustand," a change of temperament and mental action from the normal, may remain for some days or weeks even when not accompanied by another outburst.

My investigations have dealt largely with females, but such conditions are not unknown in males. In Grube's extremely detailed and careful examination of 105 of the inmates at Flehing, an institution in Baden which apparently corresponds more or less closely with the Westboro School for Boys, he finds a group of boys and young men whose temperament is usually not remarkable, that is, does not differ from that of the ordinary youth, "but whose psychic life is very easily disturbed. The mechanism of this disturbance may be one of three kinds. Einmal werden solche Menschen durch gewisse Erlebnisse sehr leicht alteriert, aus der Balance gebracht und in einen ? ! ? ! ? ! ? ! ? The second possibility of disturbance of the mental balance is not based on a *permanent* condition of heightened irritability which instantly explodes from external stimuli, but it consists in that *without any* external cause periods of painful mental perturbation " Verstimmtheit " and of a change in the internal mental outlook " Lebensgefuhl " occur, which often lead to an outburst in which the patient may feel himself impelled to free himself from his surroundings (fugue, suicide), may drink himself senseless (dipsomania) or perform acts of violence against others.

The third form lies between the two others. There is spontaneity of mental depressive change but only external stimuli induce the abnormal reaction. In the first form this extraordinary irritability was chronic: in this it occurs periodically as a spontaneous disturbance " endogene Verstimmung." The same word, the same action which such a patient has taken quietly for days and weeks, has even judged proper so upset him as to cause angry scenes and even acts of violence. Thus says Grube.

It is not worth while to consider here whether there is any valid distinction between these forms or classes of disturbance. Their occurrence in these youths points to a more general prevalence than is sometimes taken account of.

A few examples of these conditions will show the type of disturbance which distinguishes these cases.

R. H., 210. Case I. This woman was committed to Lancaster, the State Industrial School for Girls, to which girls are sent

only by the court for stubbornness, stealing or other crimes or misdemeanors. She was thence transferred to the Massachusetts School for the Feeble-Minded at Waverly. After a stay of nearly three years there, she was sent to the Westboro State Hospital (for the Insane). The superintendent, Dr. Adams, wrote of her: " (She) is a good worker most of the time but has outbursts of violence and destructiveness. She is better suited for an insane hospital than anywhere else."

K. D., 212. Case II. Was a year at the Massachusetts School for the Feeble-Minded at Waverley and was then transferred to the Westboro State Hospital.

The records there state:

February 21. Subject to attacks of violent temper; assaults people. In December, 1909, became domineering and dictatorial. Then outbreaks of temper and profanity.

April 5, 1910. Troublesome, sullen, refuses to work, shows some violence. Quarrels. Tells tales of other patients.

January 2, 1911. Dr. Adams the superintendent, writes: " Is a sly girl, causing mischief between others and seeming to delight in getting others to quarrel. Has outbreaks of using profane and obscene language. Is a very good worker, but taking it all in all is better off here than she could be anywhere else. She is treacherous. She has to be constantly watched on account of tendency to seek men."

M. E. G., 220. Case III. Was at Lancaster Industrial School. Apparently sent thence to the Massachusetts School for the Feeble-Minded at Waverley, where she was admitted in February, 1901. In July, 1901, she was transferred from Waverley to the Taunton State Hospital, an institution for the insane, and was again transferred thence to the Medfield State Asylum in October, 1902.

On transference from Waverley to Taunton, Waverley, writes: " Since here ugly (bad-tempered) and quarrelsome. Has savagely attacked several inmates and one of the attendants. Threw a bottle at the matron. Quarrelsomeness due to delusional ideas. Reads well. Writes a good letter. Housework fair."

Taunton records, July 2, 1901. For two days has refused to eat, but when told that if she continues to do this she will be fed forcibly, takes her food. Says that she does not care to live.

July 21, 1901. Attacked attendant; very violent; placed in seclusion and then pulled out a handful of her own hair. Refused to eat or micturate but did so after a time.

August 1. Doing well.

On August 4 made a violent attack on an attendant after a slight provocation, biting, scratching and spitting.

Between this and October 1 she seems to have been natural. On this date said that she felt that she was going to have a spell

(period of excitability) and was removed to another ward. Got better.

January 1, 1902. Several rather disturbed days during (past?) month.

January 12, 1902. Past few days very quarrelsome. Struck another inmate.

October 16, 1902. Since March 29 has had several attacks of excitement, during which she was noisy, abusive and violent.

The superintendent states that the periods of excitement came about once a month, but he has no evidence that they were connected with the menses.

The superintendent from Medfield writes: " My personal recollection of this patient is rather faint. Between her periods of excitement she was industrious and exercised considerable self-control. When excited and just preliminary to her excitement, when she might be called exhilarated, I judge she would be in a position to be dangerous to both herself and the community."

M. H., 234. March 20, 1911. 18 years old. Danvers State Hospital. Admitted from Massachusetts School for the Feebleminded at Waverley, March 7, 1911. Was sent to Lancaster (State Industrial School) as immoral. Committed to Waverley September 22, 1910. While there stubborn, deficient. Would stand for an hour at a time looking out of the window or in the mirror, talking to herself. Had frequent periods of excitement when she was violent. November 26, 1910, threw a glass bottle at an attendant. At times refused to eat until stomach tube was threatened.

Diagnosis at Danvers: Imbecility (high-grade). Since coming to Danvers has shown no disorder of conduct. Very quiet, somewhat seclusive; often attacks of senseless laughter. Mental examination showed limited school knowledge. Judgment defects; no hallucinations or delusions. No psychosis detected.

F. C., 236. March 20, 1911. Danvers State Hospital. Admitted from Waverley (Massachusetts School for the Feebleminded) March 7, 1911.

Record from Waverley: October 6, 1908. Excited and disturbed. Broke two panes of glass.

November 11, 1908. Excited, screaming.

December 21, 1908. Excited, tore dress to pieces.

Is a low-grade imbecile and a dwarf. Father was in Danvers for 15 yrs. (June, 1893–Dec., 1908) with primary delusional insanity. Patient has no psychosis. (Danvers.)

A. G. W., 240. March 20, 1911. 16 yrs. old. Danvers State Hospital.

Transferred to Danvers from Waverley (Massachusetts School for the Feeble-minded) July 3, 1909.

Record from Waverley: June 28, 1909. Took a small child in her arms when attendant's back was turned and threw her on the floor. Threw another little child around by the hair. Tried to jump down a flight of stairs and tore up two spreads.

Danvers' diagnosis: Idiocy. No psychosis.

Transferred to Tewksbury, March 1, 1911.

A. C. F., 244. March 20, 1911. Colored woman, 23 years old. Danvers State Hospital.

Was transferred from Waverley (Massachusetts School for the Feeble-minded) to Danvers, July, 1909, and still there.

Record from Waverley: Very sly, cunning and cruel, delighting in tormenting the younger patients. Periods of ungovernable temper. Violent, excitable, stubborn. Tries to run away. Threatened to kill some one. Eleven outbursts in six months.

Danvers' reports: Quiet, pleasant, clean and neat. Could be discharged if it were not for history. No hallucinations or delusions. Imbecility. No psychosis.

Society Proceedings

AMERICAN NEUROLOGICAL ASSOCIATION

FORTY-FIRST ANNUAL MEETING, HELD IN NEW YORK CITY, MAY 6, 7 AND 8, 1915

The President, DR. GEORGE W. JACOBY, in the Chair

CLINICAL AND KINEMATOGRAPHIC OBSERVATIONS ILLUSTRATIVE OF THE BÁRÁNY METHODS IN THE STUDY OF VESTIBULAR AND CEREBELLAR DISEASE

By T. H. Weisenburg, M.D., and I. H. Jones, M.D.

Method of obtaining nystagmus and pointing reactions. Principles upon which this is based. The Bárány method as an aid to cerebellar localization. The differential diagnosis between cerebellar and vestibular lesions. Clinical and pathological cases illustrating the value of these methods. Kinematographic studies.

SOME OBSERVATIONS ON THE USE OF THE BÁRÁNY TESTS IN VESTIBULAR, CEREBELLAR AND CEREBRAL DISEASE

By Charles K. Mills, M.D.

Reference to cases of tumors of the cerebellum, cerebello-pontine angle, third ventricle and basal ganglia in which the Bárány tests gave results of special interest. Bárány methods in the study of lesions of the cerebello-rubro-thalamo-cortical and of the strio-thalamic systems. Lesions of the posterior longitudinal bundle. Cerebral orientation centers and their connections. A general consideration of orientation phenomena as studied by the Bárány and other methods.

THE STUDY OF TEMPORARY ABNORMAL MENTAL STATES, CONFORMING TO RECOGNIZED TYPES OF PSYCHOSES

By Sidney I. Schwab, M.D.

Statement of the problem. Consideration of the psychical mechanism. Exogenous etiological factors. The question of developmental adjustment. The rôle of defense processes. The chief symptoms presented. Change in personality. Similarity of clinical picture to the conventional

psychoses. Consideration of the diagnostic problem. Case histories. Conclusions.

Dr. D. J. McCarthy, Philadelphia, thought this paper of Dr. Schwab's was not only very suggestive, but one of extreme value in the working out of this type of case that he had in mind. There is no question that the illumination of study of psychosis and border-line cases is too limited for the symptomatology as it presents itself to the physician. The general tone, tendency, so to speak, of the mind of the individual from childhood up he thought was too often neglected. We see these cases as presented in the first or second year of college or about that approximate period for study. If the doctor happens to know the development and history of the child from infancy up much information will be given to him upon which he may form a better type of prognosis and also possibly qualify his opinion about the matter. Take the types of individuals who have a tendency to irresponsibility. In the early history you find in early childhood an ungovernable temper. That the temper of the child was not under control of the parents. There is a history of self-indulgence, lack of control and all these conditions are magnified into very distinct clinical types, depending upon the management of the personality of the individual and peculiar type presented. With full knowledge the adjustment may be made by the physician. With incomplete knowledge the condition may go on with more serious consequences as far as the future life of the individual is concerned. This is one phase that this paper suggests to anyone familiar with the situation. It is an intense study of personalities. Conjointly there must go with every case the physical factors discussed at this meeting and the physical factors which lead to different personality factors, *i. e.,* tuberculosis, active or healed, often leads to suspicion and depressive, moody temperatures; the hepatic group to depression; chronic gastro-intestinal disease to a discontented, moody personality, etc.; the individual with defective glandular function along the gastro-intestinal tract. These factors taken will lead to a much more thorough knowledge of these border-line cases and help in the adjustment and the prevention of mental disorders at adolescence. In the middle-aged at the time of the male menopause we are dealing essentially with the same problem which calls for consideration. Here is the great value of the psychoanalytic method. We need not necessarily go into psychoanalysis, but straight analysis and intensive study of the whole life period as far as it can be reached.

Dr. E. E. Southard, Boston, commended highly the kind of work Dr. Schwab had been doing. Dr. Schwab's material had been heretofore neglected because such material had not come either to the general practitioners or to the institutions. Only about one quarter of the cases in the Out-Patient Department of the Psychopathic Hospital in Boston (with an intake of 1,600 patients a year) had been interned in an institution within the year.

Dr. Southard mentioned the possibility of certain somatic correlations with unpleasant delusions as substantiating a Galenical belief concerning the unpleasantness of diseases below the diaphragm.

Dr. Smith Ely Jelliffe thought that Dr. Schwab's paper directed attention to a very important situation.

In the first place the difficulties which Dr. Schwab had emphasized could be more readily appreciated if the concept of hereditary biotypes was utilized. In his own study of Huntington's chorea it had become

apparent that different characteristic trends would appear in different branches of the families studied. These trends were inheritably separately. By convergence certain trends would fall together, producing a combination which then was a Huntington chorea. All of these trends, therefore, constituted biotypes of the disease, and which had not been clearly recognized as related to the disease until the biological family analysis cleared up the situation. The utilization of this concept no doubt would throw much light on the problems raised by Dr. Schwab.

The second consideration that had come to his mind in listening to Dr. Schwab was the variation in stress brought upon these individuals as a result of changes in the social environment. A great many individuals are very well adapted up to a certain point. When that point is passed their adaptive capacity is overreached and they break down. If there is a return to old conditions in a community the readaptation may take place and the patient recovers. This may be seen in a study of any number of communities, where so long as simple primitive conditions exist, a whole host of individuals get along without much difficulty. As soon, however, as these communities grow larger, complexities enter, rivalries spring up, increased economic stress mounts and intercurrent disturbances arise, such as successive failure of crops, great disasters, floods, fires or whatnot. These produce marked changes in the environment and then the badly adapted individual shows his inability to stand the increased stress by relative breakdown. Certain portions of the country, cities or states or areas of people will live under fairly stable economic conditions for a number of years. The individuals living under this fairly equable stress will get along until a broad, widespread change takes place in the customs, manners or economics of those groups. Then the weaker members commence to be pushed out, with a result that traits, which heretofore had not been subjected to any intensive scrutiny, now become factors of maladjustment. These new economic stresses, therefore, direct attention to conditions already present but which did not stand out as defective until an increased stress made them so.

Dr. Richard Dewey, Wauwatosa, Wis., said he would like to mention very briefly a case which appeared to fall under the classification suggested by Dr. Schwab, the case of a man between 40 and 50, absolutely normal before and after his attack, who went to Europe and on his passage across the North Sea to Sweden suffered very greatly from sea-sickness. He became profoundly depressed and hopeless without other apparent cause; insisted he was sick and consulted doctors in both Berlin and Paris; who after careful examination, found no physical basis for his depression and assured him he needed no treatment. He had suicidal thoughts and impulses and unwarranted fears. He was so apprehensive about sea-sickness that he remained several months in France, beyond the time he had planned, fearing to cross the channel. Finally, all his friends rallied round and got him as far as London and by their persistent efforts he was at last gotten aboard the Atlantic liner. After landing in this country, nothing further of an abnormal nature was noticed about him. Later, he remarked with wonder upon this period of depression and upon the impulses he felt, prompting him to throw himself under the busses on the streets of Paris to end his miserable existence. He was a man who had led an extraordinarily systematic life, a banker, most exact and punctilious in business methods. Not only his bank, but his personal accounts were kept so that the last cent could be accounted for. He wound his

watch every morning at exactly seven o'clock and kept half a dozen clocks in his house running together as near as possible, regulating them every Sunday morning.

It would seem that his extra methodical home habits being broken up by travel and the supervention of very profound sea-sickness had an exhausting effect, producing undue mental perturbation and anxiety, and in this condition the effort of keeping his expense account in several foreign currencies and reducing all to American money was a factor in his illness; although his intense suffering from sea-sickness made him so apprehensive about crossing the channel and going to sea, that his reasoning power was temporarily in abeyance or controlled by an obsessive phobia.

Dr. Joseph Collins, New York, said he had a keen appreciation of the existence of this problem. In 11,000 patients that had come into the first division of the out-patient department of the Neurological Institute since its existence, in the last five and a half years, about 500 are under the designation that Dr. Schwab has referred to. Therefore Dr. Collins said he was one of those who realize the necessity of studying this problem, but he realized also more keenly that before we can get any results from discussing it we have got to have some definite idea of what we are talking about, and we can't get that until we have some definite scheme or conception of what we are going to contrast them with. That is, we must define the normal approximately. Have we set up a normal intelligence with which we are comparing these cases? Have we at the present time any scheme for testing intelligence or definitely estimating any other feature of the intellectuality of the individual? The reply is that we have not and until this is done we are not going to make much advance in this study. It does not help us to say we have a large number of cases that are allied to dementia præcox. It does not help us to designate them as simple delusional psychoses, or states allied to simple involution.

Dr. Schwab, in closing, said in answer to Dr. Southard's suggestions in regard to the preponderance of types in this class of cases he was not able to answer because he had not tabulated them from that point of view. It is the so-called emotional types that predominate. In regard to Dr. Collins's remarks he thought that standpoint was of great interest, but the simpler thing, perhaps, might be taken up first. Dr. Schwab was particularly interested and tried to show in his paper that the study of the mechanism of the formation of these things, even though we can't get close to it, might be a logical preliminary step to study them as we study other clinical problems; to try to understand something of the mechanism by which a person becomes abnormally angry or depressed. It seemed to Dr. Schwab that the preponderance of this group of cases in the out-patient clinic suggests that this is the time to apply to this group the same sort of care that we give to definite neurological cases and not to pass them by and call them border-line cases. These cases should be put in the hospital, in a bed in the wards, and should go through the same routine physically and neurologically as do the more profound types and more definite classical cases. He thought that by doing that we can get some hint at this subject.

(To be continued)

APRIL 6, 1915

The President, DR. WILLIAM LESZYNSKY, in the Chair

TUBERCULOUS MENINGO-EPENDYMITIS WITH DILATATION OF CAVUM SEPTI PELLUCIDI (FIFTH VENTRICLE)

By Frederick Tilney, M.D.

The patient, a fifteen months' infant, had a perfectly characteristic tuberculous meningitis. An interesting fact in the case, however, was that the child suffered from right hemiplegia the last three weeks before death. This warranted the belief that possibly there might be some degeneration of the Wallerian type, but no evidence was found of secondary degeneration in the motor area. Pathological examination showed a typical state of basal meningitis with miliary tubercles. There was present a sinistral version. The brain itself presented no changes except in the region of the ventricles, where there was tubercle formation giving characteristic tuberculous ependymitis. The space between the two layers of the septum lucidum was a dilated sac containing a gelatinous mass. There were also small hemorrhages in the folia of the right cerebellum. Dilatation of the foramina on both sides was noticeable (in the specimen) and also of the lateral ventricles and interior walls. The sinistral version depended upon which of the nerves was most involved. Further study would have to be given to the case. As to the formation of gelatinous material in the fifth ventricle, there was, under normal conditions, a little fluid, and therefore this fluid was an exudate from the inflammatory process into the septi. The child had died the previous December and the specimen dated from that time.

CASE OF TUMOR OF THE RIGHT OCCIPITAL LOBE

By H. Climenko, M.D.

The patient, a male, about 60 years of age, complained of failing vision and headache. *Family History:* Father died of tumor of chest wall. *Personal History:* Married 39 years; six children living and well; one miscarriage. Gonorrhea and syphilis denied. *Past History:* Patient has had diabetes for seven years; has passed small amounts of sugar, less than 1 per cent.; has had polyuria and polydipsia; has lost weight and felt weak. *Present Illness:* Began two and a half weeks ago when patient found he was doing his work improperly and had failing eyesight and slight frontal headache, with dizziness. His vertigo increased so that he was forced to give up work; he had difficulty in getting home, a distance of eight blocks, walking into many people on the way. One week previously, while reading, patient saw many colored animals and objects before his eyes, when the headache became more severe. He had hallucinations of myriads of rapidly moving objects and various colors. The vision was hazy. Since then the acuity of vision had been shown to have diminished. Headaches had become more severe and generalized, with increase of vertigo, coming on in attacks. The previous day vertigo was severe enough to make patient fall. The falling was not to

any particular side, nor did objects rotate in any particular direction. For the past six days patient had been vomiting several times daily, the vomiting recurring with increase in headache. It was not projectile. When the headache became throbbing in character, loud splitting sounds were heard, like the strokes of a hammer on an anvil. There had been no change in smell or taste; no impairment of muscular power; no sensory symptoms other than the optic and auditory ones. The physical examination showed: *Gait and Station:* Signs negative. *Eyes:* At outer angle right eye ecchymotic spot.— result of fall; pupils equal, react to light and distance; Wernicke's reaction to left; both halves of each retina sensitive to beam of light causing contraction of pupil at right lower portion of iris; conjunctiva moderately congested; no nystagmus; a left homonymous hemianopsia present; bilateral choked disc; veins markedly distended. *Lungs:* Negative except for occasional râles at bases. *Heart:* Somewhat slow. *Pulse:* Corrigan pulse; some capillary sclerosis. *Abdomen:* Reflexes diminished left side; cremasteric present and active. *Extremities:* No diminution of muscular power on either side; no atrophy; descent of right arm more rapid than left; no ataxia; no astereognosis; no change in pain or pressure but faulty localization of position of left arm (patient overpoints with right hand in trying to find the left); does not overpoint with left in trying to find right; cannot mimic position of fingers of left hand with right, but can mimic positions of right hand with left; slight hypotonia of left lower extremity; descent of left more rapid than that of right; no fault in localization; knee jerk diminished, but obtainable and equal on both sides; Achilles jerk present, equal; blood pressure, systolic 160; diastolic 60. February 16, visual fields showed left homonymous hemianopsia, quadrantic, about three eighths of left halves of fields involved, entire upper quadrant and upper part of lower quadrant. Lumbar puncture showed initial pressure = 330 mm., 5 c.c. yellow fluid removed. Exploratory craniotomy by Dr. Elsberg over occipito-parietal region; no increased tension found; no tumor found; x-ray negative; Wassermann negative in blood and spinal fluid.

Dr. Abrahamson said he saw the patient when he entered Mt. Sinai Hospital. At first there was a tendency toward quadrantic vision, but later the entire half field was disturbed. The question was, were we dealing with an occipital lobe lesion or with deeper seated disease of the optic radiations. There was some disturbance of the deeper muscle sensibility. The man could not imitate very well. Localization was not very accurate. The lesion was probably deep seated and most likely parietal as well. The brain appeared normal. It was not always possible for the surgeon, by palpation, to determine whether there was not a soft glioma involving the deeper structures. Diabetes might cause retinitis and swelling and localized softening of the brain. The history, moreover, of rather a sudden onset indicated that there had at one time been a hemorrhage which caused the exacerbation of the symptoms. The tumor was probably deep down, catching the fibers from the parietal lobes. It was more likely in the radiations than in the cuneus.

Dr. Strauss said he would like to call attention to two points. This man had an optic neuritis. Tumors in this region very often did not cause choked disc, although they were pretty large. A patient admitted to the service a week ago had come in in stupor and so a satisfactory examination could not be made. The examination of the brain revealed a large glioma with hemorrhages occupying the left occipital lobe, closing up the posterior horn of the lateral ventricles, but not going back into the calcarine region. It involved the optic radiation. There was no optic neuritis in that individual.

Dr. Dana said that the case might give rise to some historical reminiscences on his part as it was similar to the first case of operation for tumor of the brain ever done in this country. It was some twenty-five years ago, when Dr. Seguin made a diagnosis of occipital lobe tumor; Dr. Weir did the operation and found an encapsulated tumor, hard, and rather easily removed. The patient died. Dr. Dana thought, as did others, that the present case was an infiltrating glioma. One saw a good many cases with similar group of symptoms, due to thrombosis and softening, but the distinction from tumor could easily be made.

Dr. Leszynsky said he thought they must agree that this was a gliomatous infiltration, but not necessarily in the occipital lobe. In regard to the symptomatology of occipital lobe tumors, there might be very few symptoms. An intelligent woman of 44 years gave a history of several months' severe headache, with occasional vomiting and disturbance of vision. The headaches increased. Examination showed very slight optic neuritis, distinct homonymous hemianopsia, and vision 20/30 in each eye. No positive localization could be made at the first examination. Two and a half years before she had fallen and struck her head over the occipital region, but there were no immediate symptoms. Several months later Dr. Cushing found the symptoms had progressed, but very few sensory symptoms were present. He did a decompression and a few weeks later removed a very large tumor (endothelioma), originating in the tentorium and involving the mesial surface of the right occipital lobe. Later there was a recurrence.

UNUSUAL CASE OF MULTIPLE SCLEROSIS

By S. P. Goodhart, M.D.

The speaker said the case was interesting in that its symptomatology suggested differential diagnosis between disseminated sclerosis, paralysis agitans and lenticular degeneration of the Wilson type. History of the case was as follows: the patient, a Russian Jewess, aged 29, gave a negative family history except that the father and mother were first cousins. Previous to present illness patient's history was negative; initial symptoms occurred in her thirteenth year; there was a fine tremor of the right arm upon voluntary movement; the left arm became similarly affected a year later; headaches and pains along the spine followed in the next few years; larger excursion movements of the intention type developed later; at fifteen with subjective sensations of weakness there appeared flaccid paralysis of the left leg, followed a year later by the right. Tremor of the upper extremities then became more aggravated; fine tremor, of the Parkinson type, both in tempo and in character, as seen in paralysis agitans, appeared about five years ago; spasticity of both lower limbs developed gradually within the next few years and the same phenomenon together with marked contractures up the upper limbs appeared somewhat later. The extreme contractures, as seen in the fingers, with the adducted and extended thumb lying flat on the palm, and the proximal phalanges of the fingers somewhat flexed, the distal phalanges extended, together with the fine tremor with the extremity quiescent, strongly suggested the paralysis agitans position. Paroxysms of dysphagia began at the age of 26, and these attacks became so severe that when fluid was taken it would pass through the pharynx into the nose; at various times there were severe attacks of dysphagia. Speech within the last few years had become slow and meas-

ured; the voice had deepened in timbre and had a suggestive monotone; it was entirely lacking in rhythm; the facies had gradually assumed the present form; the expression was of the masked type, due in part to the spasticity of the facial muscles; forced laughter was occasional and the mouth was at times held with the lips widely separated and the jaws apart; this position and the expression were suggestive of Wilson's disease, as seen in one case. On attempts at speech there was sometimes an involuntary effect of smiling due, probably, to the automatic action of the muscles involved in this expression; on slight innervation there was a rhythmical tremor of the tongue and lips, and at times, on first attempts at speech, there was slight and occasionally an extensive tremor of the body and of the arms; on voluntary movement the tremor of the upper extremities became distinctly of the intention type; on intense emotion movements became widely extensive and irregular; there were marked flexor contractures of both upper and lower extremities. While the position of both hands and fingers was quite typical of advanced paralysis agitans, the contractures, however, were more pronounced than were found in that disease. There was nystagmus in extreme lateral position of the eye-ball, varying from rotary to lateral oscillation. The position of trunk, head, general carriage, expression of face in repose and tone of voice were suggestive of Parkinson's; on active innervation of the facial muscles, however, the expression changed to that suggestive of the euphoria not uncommon in multiple sclerosis. The abdominals were occasionally present on the right side; very indistinctly elicited on the left; in spite of the contractures in the upper extremities the reflexes were not decidedly increased; Babinski and clonus and markedly increased knee jerks were present, especially on the right side; in passive movements of the arm, the rigidities showed a tendency to cogwheel interruption, far less marked, however, than in Parkinson's. In differential diagnosis, as symptoms of multiple sclerosis there were: age and manner of inception; intention tremor; variable abdominals; slow speech; emotional symptoms; evidence of pyramidal tract involvement and nystagmus. Of paralysis agitans there were: tremor while at rest; contractures, though extreme and far more than usually seen in this disease; posture and gait, the entire body moving in toto; tendency to retro- and propulsion; voice and facies distinctive. Of lenticular degeneration there were: the occasionally widely opened mouth; contractures; excursive movements; no emaciation and no mental deterioration. Of chronic cerebellar tremor while there was a somewhat characteristic tremor, there was no hypotonia and the presence of so many other symptoms excluded this as a diagnosis. This case emphasized what all now believed, that the pathology of all the conditions above mentioned was doubtless to be found in the midbrain and its connections. The nomenclature required a change, since what we had hitherto regarded as disease entities were really symptom complexes and all part of the same pathological process. The cerebellum, the lenticular and caudate nuclei, the paths to and from the thalami were the principal seats involved.

Dr. Abrahamson said the patient had been under his observation for years at the Montefiore Home. She was almost an exact counterpart of another case, W. H., in the home for many years, and whose brain and cord were being studied by Dr. J. R. Hunt and Dr. Dunlap. The latter was described about eighteen years ago by Dr. B. Sachs under the title of multiple sclerosis and paralysis agitans in a boy. The advance reports of the findings were negative in character. The girl and the young man both showed signs of paralysis agitans, of multiple sclerosis and of Wilson's disease. It was not Wilson's disease, because that was an extra-pyramidal affection; other features nega-

tived Wilson's disease. As for multiple sclerosis, the pathological findings in
the young man showed no traces of it. It resembled mostly a paralysis
agitans and very likely the finer microscopical examinations would bear this
out. Italian investigators sought to include the juvenile cases of Parkinson's
disease with the cerebral diplegias. The crossed-legged progression, bilateral
pyramidal tract involvement, etc., in both of these cases did certainly re-
semble the clinical group of Little. At present one ought to be content with
a regional localization (leaving the nature of the process to be determined in
the future), *i. c.*, a diffuse degenerative disease of the basal ganglia and
midbrain.

Dr. Dana said that the autopsy showed in the case of W. H. that there
was no degeneration of the pyramidal tracts. He thought that neurologists
would have to follow the alienists for a time and use the term " allied to " in
their diagnosis of these cases. The case shown here, as well as that of
W. H., and some so-called cases of Wilson's disease, were in the group " allied
to " paralysis agitans. Clinically they most resembled this disease, and
anatomically the lesions were in the same regions. He was not so sure that
the lenticular nucleus degeneration in Wilson's disease was important as the
cause of the specific symptoms. The lenticular nuclei could probably be badly
softened, as in gas poisoning, and the patient get well.

Dr. Strauss asked Dr. Dana about lenticular softening in gas poisoning.
What symptoms would he ascribe to lenticular softening? Cases he had seen
of gas poisoning with lenticular involvement had come to autopsy. They had
never come out of coma.

Dr. Dana said that his views as to the symptoms of acute lenticular poi-
soning were based on certain clinical cases, and the fact that in prolonged gas
poisoning there was almost always a softening of the lenticular nuclei. The
cases he had seen had shown on return to consciousness mental confusion and
excitement, and later motor disturbances, very much like those seen in paral-
ysis agitans and the Wilson disease. In regard to this latter disease, he
thought that perhaps too much emphasis had been placed upon the importance
of the lenticular lesions than ever. In the acute gas cases there was complete
recovery with probably distinct scars in each lenticular nucleus.

Dr. Goodhart said he thought there need not be symptoms with softening
of the lenticular nuclei. One case that came to ausopsy had no symptoms.
He thought only extensive degeneration, involving the tracts passing through
would show symptoms.

ANATOMICAL STUDIES EXPLAINING LESIONS FOLLOWING THROMBOSIS OF THE POSTERIOR INFERIOR ARTERY, WITH LANTERN SLIDES

By M. T. Burrows, M.D.

Definite clinical symptoms frequently accompanied occlusion of the ver-
tebral artery where it coursed over the surface of the medulla oblongata and
the posterior inferior cerebellar artery, near its origin. The symptoms were
indicative of lesions involving the olive, the formatio reticularis in the region
of the olive, the nuclei of the ninth, tenth and eleventh nerves and the longi-
tudinal tracts passing down through the region, the restiform body and fre-
quently the root of the fifth nerve. Several cases had been reported where
areas of softening had not included the entire region indicated by the symp-
tom complex. Dr. H. M. Thomas had reported cases with typical symptoms

which had later cleared up and at autopsy the thrombosed vessels were found but there were no areas of softening. Injections of the separate arteries of the medulla had shown that the region in question was supplied by a number of small branches from the vertebral, the posterior inferior cerebellar artery, or both. In a large number of brains the branches were terminal branches. The posterior inferior cerebellar artery was variable both in size and position. It was, however, always present although in some brains it might supply only a very small part of the cortex of the cerebellum. It might arise at any level from the vertebral artery. In a large percentage of the brains studied it arose at the level of the olive to supply a part of the branches to the area in question, but only in a few cases did all these branches arise from this trunk. The nuclei of the sixth, seventh and eighth nerves were supplied by similar lateral and terminal branches. These branches arose, however in most brains from the middle cerebellar artery or the basilar. In a few brains these vessels might also come from the posterior cerebellar artery. The remaining portion of the medulla was supplied by vessels which anastomosed frequently with each other, with vessels of the spinal cord, and those of the opposite side. The portion of the descending root of the fifth nerve, substantia gelatinosa Rolando, lying at the level of the olive, might be supplied by the same vessels which supplied the penetrating arteries to the formatio reticularis, but it was frequently supplied by separate branches which coursed from below upwards or from above downwards. This was also true for the restiform body. This accounted for the frequent absence of symptoms from these parts. In a limited number of brains large anastomoses had been found between the vessels supplying the region in question, connecting the end branches of these vessels with vessels of the pons above and the spinal cord below. In a few cases these anastomoses were of sufficient size to prevent symptoms following occlusion of these arteries at their origin from vertebral or posterior inferior cerebellar artery. In others they were smaller, so that symptoms might develop for a time from a temporary anemia of the part, later to disappear without softening as the anastomoses enlarged. The latter were frequently small and variable, as were the vessels. The branches of one vessel might intermingle with others so that penetrating arteries in the same horizontal plane had a different origin. A few of these vessels might be terminal, while others had small anastomotic connections with vessels of other parts. At the instance of occlusion of these vessels symptoms indicating involvement of all of this region might be observed, while later some of the symptoms might disappear and others persisting might be variable. Where death occurred one would expect to find areas of softening not indicative of all the symptoms noted.

STUDIES OF ATYPICAL CHILDREN FROM THE DEPARTMENT OF UNGRADED CLASSES

By William B. Noyes, M.D.

Dr. Noyes said he found the commonly accepted medical terms of diagnosis often inadequate in cases of abnormal children in the public schools. The teachers had the first sifting of children for ungraded classes. The final study was accomplished by medical advisers. The Department of Health in many cities covered the entire field, but in New York the mental study was becoming the work of carefully trained specialists. There were certain well-

recognizable border-land cases, but there were also an infinite variety of forms, making definite diagnosis difficult. Symptoms of various forms merged and overlapped, and the examiner was finally apt to turn to various terms such as atypical, abnormal and subnormal children, or mentally retarded, psychasthenic, or degenerate children, various phases of the psychopathic constitution. After a study of about 1500 children of all grades of abnormality certain well marked facts appeared definite. Typical epilepsy was recognizable by teacher and physician, but there were emotional outbursts and temperamental reactions often seen which might be classed as a psychic equivalent of epilepsy, but could rarely be proved. For instance, a boy of 5 years, of intelligent family and good social position, was a candidate for the ungraded class chiefly on account of uncontrollable spurts of temper. His past history included nothing more than convulsions in infancy. In Dr. Noyes's presence he had a typical attack of petit mal epilepsy: he stood still, looked dazed, became unconscious momentarily, rolled his eyes, twitched his facial muscles, and then resumed work as if nothing had happened. Without these symptoms being observed his emotional reaction would not be accounted for. A second similar case, a boy of 11 years, with fair mentality, was more violent and incorrigible. He had no convulsions, but his brother was an epileptic. His temperamental attacks may have been the psychic equivalent of epilepsy or the epileptic characters. The " fidgity " or " restless " children were seen in every class. This was often difficult to differentiate from Sydenham's chorea. Many of these children also showed a motor irritability, emotional instability, failing attention and mental fatigue, which might be called the psychic equivalent of chorea. Given these symptoms with some form of twitching, a diagnosis was possible, especially if confirmed by " rheumatic " attacks and neurotic action or valvular disease of the heart. These children needed careful and individual treatment. The ungraded class should be used for these rather than the lowest grades of feebleminded and moral defectives. In this connection it was an important thing that terminology of mental deficiency should be standardized, so that workers should not emphasize different phases of the same disease. Six factors also should be considered in selecting candidates for ungraded classes: (1) Family history and environment; (2) Previous history; (3) Present condition; (4) Reaction of child to environment, that is, moral behavior; (5) Mental peculiarities; (6) The child's relation to his school work. The teacher was often better fitted than the physician to find out the child's environment. Alcoholism, shiftlessness, want of work, employment of mothers, were all factors to consider. The poor were prolific and one child after another would follow at school with the same bad heredity, although from some bad sources would appear one or two perfectly normal children. The most obstructive influences were not always met with in foreign immigrant families. Middle-class American families often actively or passively obstructed the work of the school if they could, but the Italians and allied races were the worst offenders and would gladly put their children to work instead of school if permitted by law. There was often a hereditary illiteracy among these families, due to lack of interest, and the arrival of the father before the rest of the family gave opportunity for infection by syphilis. Tuberculosis was also a racial disease among the Italians, with its evident deteriorating effect upon a sturdy stock. Scandinavian races presented their own race problems. The Hebrew erred on the side of wanting to get too much instruction for their children and kept them for long hours in Rabbinical schools. This wrecked the health of hundreds of children, but was difficult to control. The work of the Department of

Education was not intended to rival the Department of Health or that of clinics dealing with the welfare of the child. It was its particular work to learn what particular factors caused retarded mentality. Thus errors of vision were found in many subnormal or morally deficient cases. Children were found in the ungraded class who had been struggling for years with only 50 per cent. vision. To know what results would be obtained if the parents carried out the recommendations of the Health Department, the school authorities made every effort to influence the parents to carry them out. Public School No. 110, Principal Miss Simpson, was foremost in this work, and reports on 46 children in the ungraded classes out of 100 examined by Dr. Noyes were as follows, after the children had had operations for adenoids, and hypertrophied tonsils :

Per Cent.

Physical improvement, rapid and marked 86.9
Physical improvement, slow and slight 8.7
No apparent improvement 4.3
Mental improvement, rapid and marked 80.4
Mental improvement, slow, definite, slight 10.8
No improvement 8.7
Improvement mentally and physically 91.3
No improvement whatever 4.3

The need of adequate physical training was seen every day, but special training for individual children was difficult to obtain or have carried out unless the teacher assumed it in addition to her other duties. It was also an obvious fact in every school that there were many varieties of atypical growth, from the great physical overgrowth to the obese, undersized or dwarfish. There were also cretin and cretinoid types and cases of asymetry and local malformation. This is always observable in chronic mental disease in asylums and should be expected in cases where mental deficiency exists at an early age. Cases of abnormal function of the ductless glands were also seen in nearly every ungraded class.

Case I. Stanley T., 17 years, 6 feet 2 inches high, enormous hands and feet, frontal bone and supraorbital ridges enormously thickened; various stigmata of degeneration present, such as high arched palate, irregular pointed teeth, underslung jaw, incoördination of eye muscles; mental attainments six years; emotionally torpid; easily confused; at the present he was deteriorating rather than advancing. He was a case of typical acromegaly. Case II. Donald C., 17 years, 5 feet 7 inches, mental age by Binet test six years; many stigmata of degeneration; with enormous hands, feet and nose as in previous case, although not a typical case of acromegaly; he was mentally a low-grade moron who had been trained to fair attention and memory. Case III. Hypothyroidism, Edith G., 19 years, of normal parents and one of six living children; in 1911 was 38 inches high; grew in four years to 56 inches; regarded as mild cretinism and put on thyroid extract; began to develop and learned to read; wrote fairly well but slowly; at present showed exophthalmos, V. Graefe's sign; pulse 100; no goiter; perspiring hands; hypothyroidism changed to hyperthyroidism; thyroid extract previously stopped; Binet age 7. Takes great delight in manual work and makes doll's clothes. This was an example of hypothyroidism changing to hyperthyroidism. Case IV. Bessie C. (possible defect of posterior pituitary lobe, or polyglandular condition). Seen by Dr. Smort in 1908. Family history negative; healthy parents; six other living children, normal, in school; Bessie had

defective vision; enlarged tonsils; adenoids; valvular disease of heart; placed in ungraded class because of poor work, especially arithmetic; she had poor attention; memory and poor general intelligence; had grown extremely fat; height 4 feet 11 inches; not treated with thyroid extract; developed exophthalmos; V. Graefe's sign; nystagmus; pulse 102; mentality had improved so that she was returned to graded class. Retardation found to be due in part to defective eyesight. Case V. Cretinism at four years; was treated with thyroid with no improvement; later given pituitary extract with good result and developed interest in her surroundings and muscular coördination. Case VI. Emma F., 17, normal history; intelligent parents; four healthy brothers and sisters; personal history normal except general clumsiness; no infectious disease but measles; menstruated once at 14; never again; no symptoms of suppressed menstruation; mentally normal but slow; dreamy; abnormally sensitive; memory good; good linguist; attention wandering; happy, affectionate; no sexual trend of thought; not interested in sexual matters; was examined by woman gynecologist; found infantile uterus; the girl had never menstruated and at 21 was a purely asexual type. The difference between girls who menstruated early and those who commenced later was marked and easily recognizable by any teacher, both neurologically and mentally. Arrest of mental development after puberty was not unusual. The ungraded classes also included Mongolian iodiocy, types suggesting polyglandular disease, hypothyroidism or hyperthyroidism, the latter fairly common among girls, and unfortunately often not noticed until the exophthalmos and other classical symptoms show the disease too far advanced for simple therapeutic measures. There were also seen among boys cases of premature or retarded sexual development, and cases of children of " shut in " personality were sometimes associated with peculiarities of sexual development. Dangerous traits varied in different schools, and were noted variously by teachers: fighting, bullying, stealing, sexual offenses, drug habits, collecting of obscene literature were among these. It could be stated that the criminals and prostitutes of 1925 were in the schools to-day. The general type most constantly present in ungraded classes came from parents physically and morally unfit to have progeny, who were often best classified as psychic constitutional inferiority. Cases of drug habit, either cocaine or morphine, were occasionally seen. Several cases of simple misdemeanors or incorrigibility in school were found to be definitely associated with criminal tendency later.

In general the study and special treatment of motor defects in school children suffering from mental deficiency offered the most promising field of hopeful treatment. In a school in Brooklyn, a class of low-grade boys had been not only physically but mentally and morally radically improved by training them in athletics and making a basket ball team out of them that eventually became the winning team of the school.

Dr. Noyes concluded by urging most thorough study of all cases of delinquency met with in the schools, if for no other reason from the fact that a large percentage of criminals and prostitutes of 1925 are at this present time in the public schools. He recommended an early diagnosis in the types of constitutional inferiority where no possible improvement could be expected.

Dr. Climenko said he would like to ask Dr. Noyes a few questions. The Jewish race had practiced long hours of study for 2,000 years, and it had not hurt them. Why restrict that now? What was a mental or psychical equivalent of chorea? He understood that chorea was an acute infectious disease; how could there be a psychic equivalent? He did not understand the report of " infantilism of the uterus." How were the exact measurements obtained?

In regard to Jewish mental deficiency—he thought there was a peculiar psychology of the Jew. The imagination was overdeveloped in the Jewish child. It worked at the expense of the other faculties.

Dr. Neustaedter said he was connected with the Board of Health in school work, both clinically and privately. Dr. Noyes was to be congratulated on the amount of ground he had covered. The society should arrange a symposium on the subject to discuss the question from the standpoint of public education.

Dr. Noyes said the point in regard to the Jewish children working after hours in a Rabbinical school was a serious one. The surroundings might be unsanitary, the child might be sick and tired out. This might be a serious menace. Sydenham's chorea might be an infectious disease, but the question raised in the paper was as to whether there might not be an accompanying mental state. The child was nervous, cried for nothing, and failed in school work, especially in attention and memory. If they could diagnose such cases, they were doing good work. The case of infantilism was observed in private practice over several years. The gynecological examination was made by a competent woman physician by rectum and was accurate. Pituitary extract was used in this case without result. There were certainly distinctive features among Jewish children as among other races, but there was a similarity in defectives of all races, and they were usually lacking in imagination. The Jew was less liable to the more brutal and coarser types common to other nationalities.

Periscope

Deutsche Zeitschrift für Nervenheilkunde

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ABSTRACTED BY N. W. YAWGER, Philadelphia

1. Congenital Muscle Hyperplasia. ROSSI.
2. Corpus Callosum Softening. ROSSI.
3. Angioma Racemosa Venosa of the Left Motor Region. CASTEX and BOLO.
4. Pathological Anatomy and Pathogenesis of Amyotrophic Lateral Sclerosis. MARGULIS.
5. The Participation of the Dynamic Quality of the Nervous Apparatus in the Course of the Motor Disturbance after Hemiplegic Paralysis. SZPANBOCK.
6. Pseudosclerosis. RAUSCH and SCHILDER.
7. Neck and Shoulder Pain in their Relation to Affections of the Organs in the Small Pelvis. LAPINSKY.
8. Remarks which Agree with the Work of Stertz: The Clinical Position of Amnesic and Transcortical Aphasia, etc. GOLDSTEIN.

1. *Congenital Muscle Hyperplasia.*—A case is here reported of a child fourteen months old in whom the right arm was much larger and better developed than the left, also the right breast and abdominal muscles, together with pigmentation and teleangiectatic markings upon the body. Sections made from a piece of excised muscle showed a true hyperplasia. For this unusual condition no satisfactory explanation could be offered.

2. *Corpus Callosus Softening.*—Rossi reports a case of aphasia in a man forty-six years old, who was under observation a little over a month and then died of bronchopneumonia. Alcoholism, syphilis and kidney disease were ruled out. The patient showed a condition of peculiar mental torpor in which the higher psychical activity was involved. There was inequality of the pupils, slight hypofunction of the muscles supplied by the facial nerves and a spastic tetraparesis.

3. *Angioma Racemosa Venosa.*—This tumor was observed in a man forty-three years of age, who had had headache for ten years. Finally, he developed right-sided paralysis with Jacksonian convulsions. The first examination showed a flaccid paralysis on the right side, involving the glutei, ileopsoas, together with the muscles of the thigh, leg and foot; the reflexes were exaggerated with a positive Oppenheim, Strümpell, and Brissaud. The reflexes were slightly increased upon the left side. Five days later there was a complete right hemiplegia, including the face, together with motor aphasia and left-sided homonymous hemianopsia. The Jacksonian attacks now amounted to "epilepsia continua." The diagnosis of organic lesion of the left motor region was made and the operation which was done in two parts removed from the pia a racemose venous angioma. The pia was very vascular and there was extensive hemorrhage which was controlled with difficulty. The

removal of the tumor caused a subsidence of the symptoms and after seven months the patient was discharged cured.

6. *Pseudosclerosis.*—These authors observed two cases of pseudosclerosis in one family. The patients were sisters and in one the symptoms began at twenty-six years and in the other at thirty-three years. The symptoms were tremor, adiadokokinesis, scanning speech, insufficiency of the liver and there was brown pigmentation at the edge of the cornea. These authors regard Wilson's progressive lenticular degeneration as a special type of pseudo-sclerosis.

7. *Neck and Shoulder Pain.*—Lapinsky writes of a common clinical condition but one which has not received its share of attention. That the condition he describes is so frequently associated with disease of the organs of the small pelvis, has not been heretofore so strongly emphasized. This author contends that many hundred patients have been observed who prove the connection between the before mentioned condition and the changes so frequently met with in the cutaneous covering and the musculature of the neck and shoulders.

The objective examination of these patients shows several characteristic changes: (*A*) Contour of the neck and shoulders; (*B*) position of the head, neck and part of the spine; (*C*) color and texture of the skin; (*D*) condition of the muscles; (*E*) activity of the vasomotor system.

In the fully developed cases, there are three stages which culminate in from one to three years.

In the first stage there is but little change in contour. The skin may be less pliable but there is little thickening. Upon scratching there is a sharp vasomotor response in the form of a deep red, broad line with little branches starting from it. There is hyperesthesia to pressure.

The second stage shows limitation of motion in the neck and shoulders but with no true crepitation. Upon careful palpation the characteristic muskelschwielen and diffuse thickenings may be made out.

In the third stage, through contractures, there develops a slight lordosis of the cervical vertebræ. The skin is now very sensitive to pressure and stretching. Dermographia is of a high degree over the regions affected and the muscle thickenings are more extensive and of firmer consistency.

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Figures in brackets [ ] indicate discussion. Figures with asterisk (*) indicate original articles and are accompanied with title. Figures unaccentuated, accompanied with title, indicate abstracts; without title, book reviews.